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THE BIRDS OF CUSTER AND DAWSON COUNTIES, MONTANA.

BY E. S. CAMERON, F. Z. S. L., M. B. O. U.

Plates V–XII.

INTRODUCTION.

THE present list of birds known to occur in Custer and Dawson Counties, Montana, is the result of observation extending over a period of eighteen years and including almost every part of the area named. A few localities which I was personally unable to visit have been explored by my wife who is a keen observer of birds. I wish to take this opportunity of expressing my indebtedness to Mr. J. H. Price of Knowlton who has been familiar with eastern Montana since the eighties, and was at much trouble to send me information, skins, and notes, besides assisting my investigation in every possible way. Also to Mr. Dan Bowman for many interesting notes of especial value, as he was one of the pioneer settlers of Custer County. As far as I am aware, no list of birds of Dawson County, or any part of it, has hitherto appeared, but the late Captain Platte M. Thorne, U. S. A., published an excellent list, numbering 137 species, of the Birds of Fort Keogh, near Miles City (Custer County), in 'The Auk' for July, 1895, and upon this any subsequent list must necessarily be based.

Regarded geographically the area embraced by the two counties may be divided into river valleys, pine hills, rolling prairie and badlands, but from an ornithological standpoint, as will

presently appear, only two of these divisions deserve recognition, viz.: the pine hills and the prairie. The same physical conformation prevails throughout the country and may be described as a succession of high divides clothed with pines, which slope, more or less gradually, to large rivers.

Most of the intermediate country consists of rolling prairie, intersected by creeks fringed, as are the rivers, with cottonwoods, here and there relieved by a sprinkling of ash, box elder, and willow. In certain districts, however, irreclaimable badlands extend from the top of the divides downwards to the rivers, the most important tract in our area being that known as the Missouri Brakes on the river of the same name, to which I shall again refer. There are no mountains, properly so called, in either county, but Mountain Sheep Bluffs in Dawson County (the greater part of which is still unsurveyed), rise to 4,000 feet above sea level, and Glendive, the capital, has an elevation of 2,091 feet; while Maxwell Butte, on Mispah Creek, in Custer County, is 3,261 feet above sea level, and Miles City, the capital, 2,334 feet. Nor are there any lakes, properly so called, but the abundant rains of certain years form prairie ponds, often several acres in extent, which afford grateful resting-places to passing wild-fowl. Forks Lake, containing about 160 acres, on a fork of the Redwater River (north Dawson County) never becomes entirely dry. The total area of Custer County is 9,368,000 acres, or 14,637 square miles, and that of Dawson County is 13,280 square miles.

Owing to the fact that badlands are generally adjacent to pine hills, and often themselves conceal in their ravines and gulches a thick growth of pines and cedars, the avifauna of the two districts overlaps and is in most respects identical. The same remark applies to the prairie and river-valley regions, for the species frequenting the river bottom ascend the tributary creeks to the plains, and wherever the latter rise into pine hills which enclose wide parks, as in the neighborhood of Knowlton, there will prairie birds, like Curlews and Bartramian Sandpipers, be found nesting.

A few species, such as the Mourning Dove, Nighthawk, Arkansas Kingbird, Horned Lark, Meadowlark, Redpoll, Lark Sparrow, etc., are ubiquitous. Hence it is clear that faunal areas, in the

ordinary sense of the term, even as between prairie and pine-hills, do not admit of precise definition, although the lists made in the two regions plainly indicate a marked diversity in the species inhabiting them.

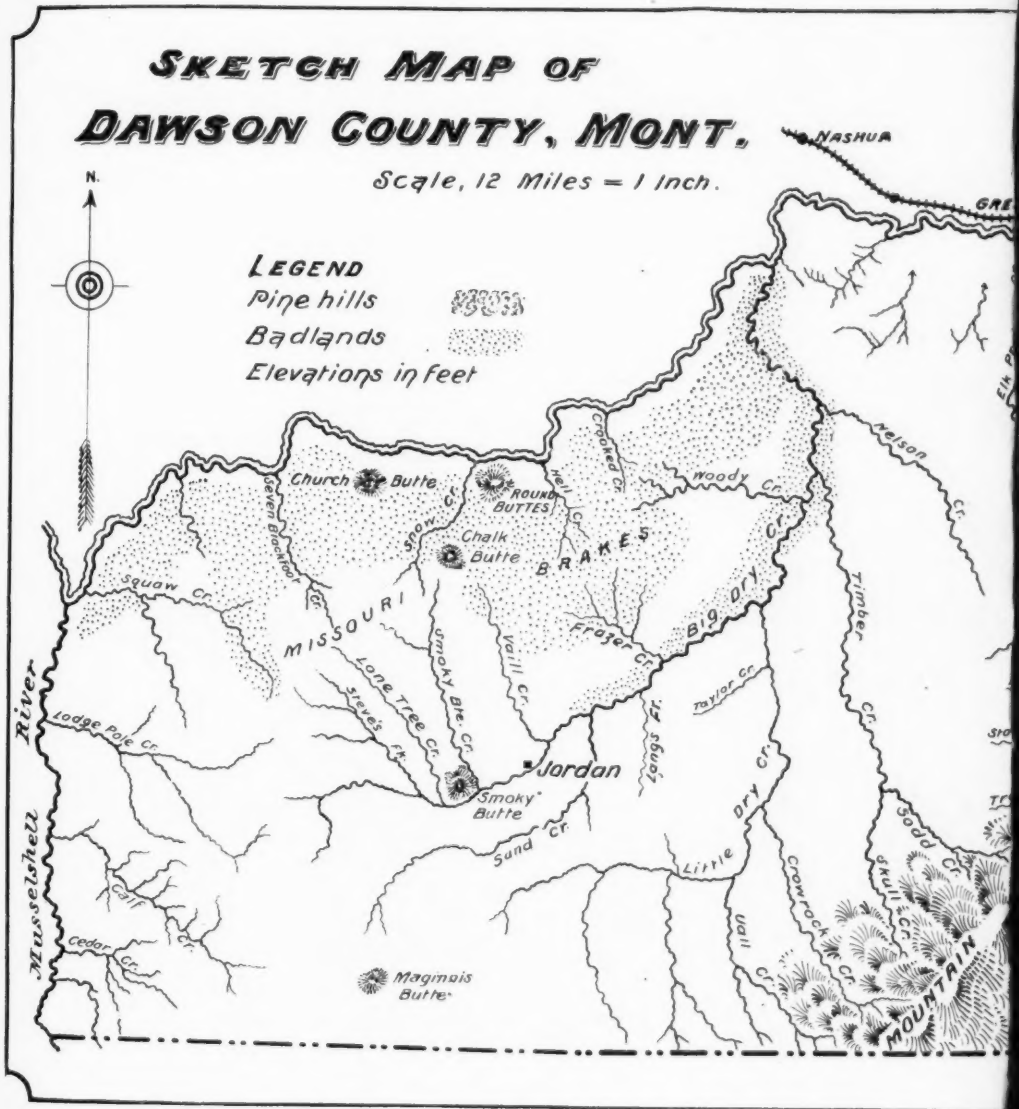
There are few indigenous birds in eastern Montana, and those of necessity are such as can support great extremes of temperature. In my own list of 190 species only 19 are permanent residents. They include the Sharp-tailed Grouse, Sage Grouse, Ferruginous Rough-leg, Golden Eagle, Prairie Falcon, Duck Hawk, Long-eared Owl, Western Horned Owl, Burrowing Owl, Hairy Woodpecker, Batchelder's Woodpecker, Desert Horned Lark, American Magpie, Piñon Jay, American Crossbill, English Sparrow, Northern Shrike, Slender-billed Nuthatch, and Long-tailed Chickadee. The remaining 171 species are either transient spring and fall migrants, summer visitors which nest here, or winter visitors which leave in the spring. Exhausted migrants are met with in most unusual situations. Mr. Lance Irvine, for example, has picked up a Coot on the open prairie, and seen a flock of Great Blue Herons resting in a like situation, while I have flushed a Sora from creeping cedar in the pine-hills. Warbling and Red-eyed Vireos have been caught on my veranda, and Pintail Ducks have alighted just outside of it. Many other instances might be cited.

Both our counties belong to the so called 'plains' region of the west where ranching, or the raising of cattle, sheep, and horses, is the only industry. Rolling prairie is therefore the predominant type of country, sage-brush the characteristic plant, and the Sage Grouse, which everywhere follows the plant, the characteristic bird. This species finds a permanent home in the wilderness of pale green bushes which, albeit they wither to yellow brown in winter, retain their foliage, and thus afford both food and shelter to the bird throughout the year. Icy winds in winter sweep over the khaki-colored expanse, the sage tops thinly veiling the deep snow beneath; and, while under such conditions Sharp-tailed Grouse burrow into the drifts, the more hardy Sage Grouse seems quite comfortable — even in a temperature of 40° below zero (Fahrenheit).

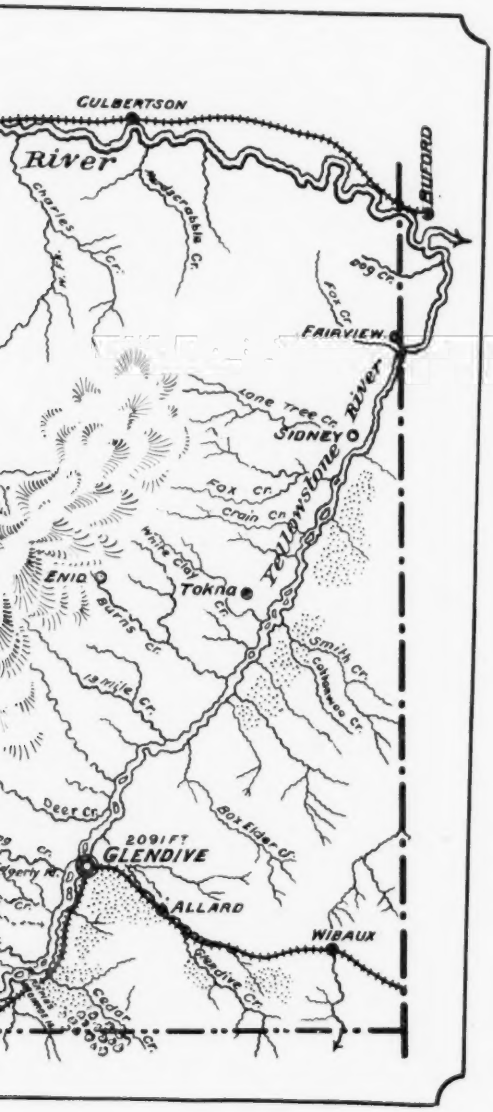
Many flowering plants adorn the prairie in summer, the most conspicuous being the triennial soapweed, whose tall stalks, cov-

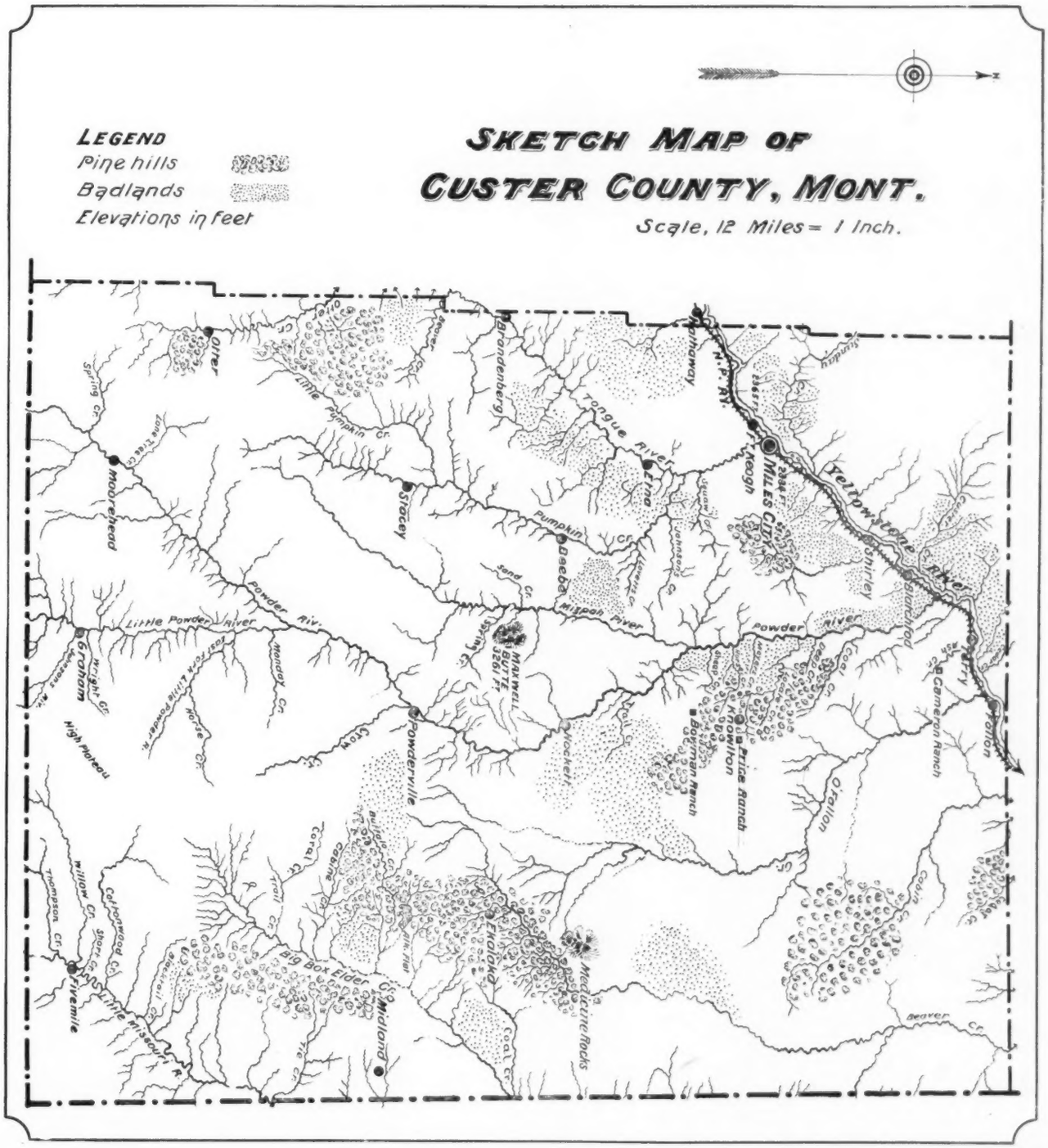
ered with cream-colored bell-shaped blossoms, flourish in profusion on gravelly or sandy hills. Among less pretentious flowers are several kinds of lily, yellow daisies, blue hairbells, and quantities of purple vetch. During May, 1892, I travelled on horseback up the Tongue River from its mouth at Miles City to the Big Horn Mountains, a distance of 205 miles, returning by the same route in August, and obtaining thus abundant opportunity to observe the distinctive vegetation and bird-life of the prairie. On the return trip ranch thermometers registered the high temperature of 114° in the shade.

By far the greatest number of birds, both as regards species and individuals, are to be seen along the banks of the large rivers, but ornithological exploration in the badlands derives a peculiar charm from their extraordinary geological features and their intense solitude. Miles may be traversed with never a sign of man nor a sound more civilized than the Falcon's angry scream. The typical breeding birds of the badlands are the Golden Eagle (*Aquila chrysaëtos*), Prairie Falcon (*Falco mexicanus*), Duck Hawk (*Falco peregrinus anatum*), Say's Phœbe (*Sayornis saya*), American Magpie (*Pica pica hudsonica*), Cliff Swallow (*Petrochelidon lunifrons*), and Rock Wren (*Salpinctes obsoletus*). As previously stated, the most important tract of badlands is that known as the Missouri Brakes in Dawson County which borders the Missouri River between the mouths of the Big Dry and Mussellshell, extends to 65 miles long by 10 wide, or thereabouts, and is almost entirely composed of gumbo clay. Notwithstanding its generally arid character, large groves of fir, lodge-pole pine, and red cedar, are to be found under the main divide, which I have twice visited during extended hunting trips in the locality. The first time was during March and April, 1890, when it constituted a regular sportsman's paradise, being full of mule deer, mountain sheep, and grizzly bears. On account of the time of year, however, only the latter were hunted. On April 7 the migration of wild-fowl was at its height, and I have never since seen the Anatidæ so numerous as when camped near the Big Dry River at that date. A second expedition was made early in October, 1895, in company with Mr. J. H. Price, and on this occasion a list was made of the birds observed in the Missouri Brakes at that time. The characteristic


SKETCH MAP OF
DAWSON COUNTY, MONT.
Scale, 12 Miles = 1 Inch.
N.
LEGEND
Pine hills
Badlands
Elevations in feet
NASHUA
Church Butte
ROUND BUTTES
Chalk Butte
BRAKES
Snow Cr.
Hell Cr.
Crooked Cr.
Woody Cr.
Nelson Cr.
Timber Cr.
Big Dry Cr.
Seven Blackfoot Cr.
Squaw Cr.
MISSOURI
Lone Tree Cr.
Steve's Cr.
Smoky Bte. Cr.
Vaill Cr.
Frazer Cr.
Taylor Cr.
Sage Cr.
Lodge Pole Cr.
Jordan
Smoky Butte
Sand Cr.
Little Dry Cr.
Crowrock Cr.
Skull Cr.
Soda Cr.
Vail Cr.
Cedar Cr.
Magmais Butte
MOUNTAIN
Musselshell River

NASHUA
GREAT NORTHERN RY.
POPLAR
Missouri
Elk Prairie Cr.
Sand Cr.
Wickerwall Cr.
Sheep Cr.
Wolf Cr.
Cow Cr.
Redwater
Melson Cr.
Duck Cr.
Spring Cr.
Lost Cr.
Timber Cr.
Horse Cr.
Antelope Cr.
Stony Bte Cr.
Trail Cr.
Sand Cr.
Skull Cr.
Rock Cr.
MOUNTAIN
SHEEP
Pasture Cr.
Sullivan Cr.
Bluff Coral Cr.
Sioux Cr.
Cottonwood Cr.
Buffalo Sp. Cr.
Tussler Cr.
Ash Cr.
4000 Ft.
BLUFFS
Clear Cr.
Deer
Spring Cr.
Edgerly Mt.
Cedar Cr.
Cameron Ranch
FALLON


GULBERTSON
River
Charles Cr.
Sandstone Cr.
Big Cr.
Fox Cr.
FAIRVIEW
Lone Tree Cr.
SIDNEY
Yellowstone River
FOX Cr.
Crain Cr.
White Clay Cr.
ENID
Tokna
Burns Cr.
Smith Cr.
Calfcreek Cr.
13 Mile Cr.
Deer Cr.
Box Elder Cr.
2091 FT
GLENDIVE
ALLARD
WIBAUX
Creadive Cr.
Cedar Cr.


LEGEND
Pine hills
Badlands
Elevations in feet
SKETCH MAP OF
CUSTER COUNTY, MONT.
Scale, 12 Miles = 1 Inch.
Otter
Spring Cr.
Pumpkin Cr.
Moorehead
Stacey
Brandenberg
Tongue River
Ismay
Miles City
Yellowstone River
Shirley
Powder River
Little Powder River
Graham
Wright Cr.
Horse Cr.
Monday Cr.
Powderville
Maxwell Butte 3281 ft.
Pumpkin Cr.
Ismay
Hibbard
Knowlton
Bowman Ranch
Price Ranch
Cameron Ranch
Terry
Fallon
O'Fallon Cr.
Beaver Cr.
Trail Cr.
Rockett
Coal Cr.
Ekalaka
Medicine Rocks
Midland
Big Box Elder Cr.
Willow Cr.
Thompson Cr.
Short Cr.
Little Missouri R.
Fivemile
Cabin Cr.
Spring Cr.
Hay Cr.
Deer Cr.
Beaver Cr.
Sand Cr.
Hibbard
Stacey
Erna
Ismay
Miles City
Yellowstone River
Powder River
Knowlton
Terry
Fallon
Ekalaka
Midland
Powderville
Graham
Moorehead
Otter
Fivemile

U of M

species were found to be the Slender-billed Nuthatch (*Sitta carolinensis aculeata*), Chickadee (*Parus atricapillus occidentalis*), and Townsend's Solitaire (*Myadestes townsendii*).

Another very wild range of badlands, commencing opposite Terry, extends along the north side of the Yellowstone River to a point about four miles west of the mouth of Custer Creek. I have explored these badlands many times, and have noted among other remarkable features a silicified tree bridging a ravine. Other smaller tracts of badlands occur on the Powder River and elsewhere.

In the badlands of the Yellowstone, despite their reputed aridness, there are surprising bursts of sporadic vegetation. Over the sombre clay walls and terraces the flowery month of June splashes a bright blaze of brilliant colors, as on a painter's palette — here a rich gamboge of yellow daisies, there the deep mauve of hyacinthine blooms, elsewhere the delicate carmine of clustering vetches, and the chaste white of Mariposa lilies. Yellow pines are most numerous and reach their greatest development around Ekalaka and Knowlton (Custer County). A pine covered area thirty miles long, extends from five miles east of Medicine Rocks to a point fifteen miles south of Ekalaka. About five miles south and east of the latter it becomes a regular forest; some of the trees are three feet in diameter, and attain a height of sixty feet before they are branched.

The widest belt of pines and cedars combined is formed by the impenetrable thickets on Cedar Creek (Custer County), which runs into the Yellowstone at Monroe Island Rapids. In places this belt is over two miles across. I built a rough shack and stable within these woods, where, in the early nineties, I was accustomed to go every winter for a few weeks to hunt deer. The thickets were simply alive with Bohemian Waxwings, which subsisted on cedar berries, and gyrated in thousands when disturbed from the high pines beneath which the red stained snow gave evidence of their familiar roosting places. In summer, among the characteristic birds which nest in the pine-hills, are Piñon Jays, Chipping Sparrows, Lazuli Buntings, Chickadees, and Mountain Bluebirds. My ranch in Custer County, five miles south of Terry, was a great haunt of Sharp-tailed Grouse and many other birds,

acres and acres of rose brush clothing the creek bottom while large patches of wild fruit trees were abundant on the hillsides. Under the taller ash and box elders spread a net-work of clematis, which intertwining with plum-trees and choke-cherries, overhung the smaller bushes, the whole forming an impenetrable covert, containing several springs of water while yielding its store of food to the birds. At one place so dense was the thicket, where it joined the north window of the ranch-house, that entry thereto was impossible save by using a fallen tree as a bridge.

Numbers of newly arrived migrants would work through this labyrinth from the north end until their further progress was barred by the window above mentioned. In this way many rare visitors were first observed from inside the room, such as Townsend's Warbler, White-crowned Sparrow, Olive-backed Thrush, etc.

My wife used to thread blue-bottle flies and hang them outside the glass, for the pleasure of watching the Long-tailed Chats and Redstarts, which would suddenly appear and pull them off the string. Many birds nested within these thickets; some of which, to the best of my knowledge, did not do so elsewhere in the county, such as the Black-billed Cuckoo and Cedar Waxwing.

In 1902, I built a ranch in Dawson County amidst pines four and a half miles to the north of Fallon, on the Northern Pacific Railway, and moved over there. The house is situated below some springs surrounded by pines and cedars where I have placed three water-troughs. All species of birds inhabiting the pine hills of eastern Montana visit them to bathe and drink. It is indeed a charming sight in summer to watch the flocks of Crossbills, Piñon Jays, and Goldfinches descend to the water, while in winter such numbers of Rosy Finches come, that the sound of their wings resembles the wind in the pines. Even mule deer from adjacent badlands drink regularly here, passing in early dawn within thirty-five yards of the house. This shows what may be accomplished where the peace of nature is never disturbed.

LIST OF SPECIES.

1. **Colymbus nigricollis californicus**. AMERICAN EARED GREBE.— Not common. A young male was shot by the ferryman at Terry on October 2, 1904, when I kept the skin. Mr. J. H. Price obtained an immature example in summer plumage on Locate Creek and made a skin. I saw two adults floating down the Yellowstone on May 7, 1905.

2. **Podilymbus podiceps**. PIED-BILLED GREBE.— Not common. Sixteen seen May 23, 1904, and eight May 31, 1904. Their manner of diving backwards with head up stream was very noticeable.

3. **Larus argentatus**. AMERICAN HERRING GULL.— Tolerably common, flying up or down the Yellowstone in the fall.

4. **Larus delawarensis**. RING-BILLED GULL.— Tolerably common. Occurs in spring and fall on the Yellowstone. An adult specimen was shot by the ferryman at Terry, May 31, 1906.

5. **Larus philadelphia**. BONAPARTE'S GULL.— Rare. A Bonaparte's Gull in first plumage was shot by Mr. Charles Mackay on August 12, 1904. It was flying over a small lake at his ranch twenty-two miles from Terry. An adult observed by me flying down the Yellowstone on July 31, 1905.

6. **Xema sabinii**. SABINE'S GULL.— Rare. An immature example of this gull was shot on the Yellowstone by the ferryman at Terry, September 23, 1904. He said he had seen about twenty-five others of this species on the previous day.[1]

7. **Hydrochelidon nigra surinamensis**. BLACK TERN.— Erratic migrant in both counties. Ten seen June 8, 1895; three August 6, 1898; two July 2, 1905; one May 26, 1906; and two May 30, 1906. Mr. J. H. Price has also observed it in his vicinity (Knowlton). Extraordinarily tame when hovering over prairie ponds.

8. **Phalacrocorax dilophus**. DOUBLE-CRESTED CORMORANT.— Rare. A single bird was seen by my wife sitting behind a rock, at the edge of the Yellowstone, on October 16, 1904. When she was quite close it flapped into the water.

9. **Pelecanus erythrorhynchos**. AMERICAN WHITE PELICAN.— Rare. Mr. Dan Bowman is positive that a pair of pelicans nested on a small wooded island in the Powder River near the mouth of Locate Creek during the summer of 1884. He constantly saw both birds flying there, when camped on the river during the months of June and July, and later one only (as he supposed the male), fishing along the river bank. Unfortunately he did not investigate. Peter Lorenson shot two specimens near Miles City on September 5, 1898. Mr. A. S. Wiley shot a pelican on the Yellowstone in 1903.

10. **Merganser americanus**. AMERICAN MERGANSER.— Rare. On No-

[1] See Auk, Vol. XXII, p. 76, 1905.

vember 12, 1904, a pair of adult males flew low over the ferry boat, at Terry, and alighted on the Yellowstone when I was crossing it.

11. **Merganser serrator**. RED-BREASTED MERGANSER.— Rare. On April 7, 1890, several were seen on a muddy reed-grown lake, in a mixed multitude of other wild-fowl, near the Crow Rock, Dawson County. On February 25, 1902, I saw five mergansers flying which I took to be of this species.

12. **Lophodytes cucullatus**. HOODED MERGANSER.— Rare. A female or immature male of this species frequented a pool on my ranch, near Terry, for several days at the end of June, 1898. When I approached close it showed anxiety by elevating the crest and wings but did not fly away. I observed another on the Yellowstone May 7, 1905. Captain Thorne saw about twenty Hooded Mergansers daily from June 14 to July 17, 1889.

13. **Anas boschas**. MALLARD.— Common on migration. A good many pairs used to breed in Custer County in the early nineties but I have not heard of a nest for many years. Mallards still nest in Dawson County, on Cow Creek, a west fork of the Redwater River.

14. **Chaulelasmus streperus**. GADWALL.— Not uncommon on the Yellowstone. Transient. Numerous on April 7, 1890, near the Big Dry, Dawson County, when I shot two adult males. Mr. J. H. Price has also shot these ducks.

15. **Mareca americana**. BALDPATE.— Not uncommon on the Yellowstone. Transient. I have shot widgeon in both Custer and Dawson Counties. Mr. J. H. Price has also obtained them at Locate Creek, Custer County.

16. **Nettion carolinensis**. GREEN-WINGED TEAL.— Abundant on migration. The bags of wild fowlers made here consist chiefly of this duck and the next. For two days in September, 1892, I observed both species of Teal flying down Tongue River in very large flocks. At that time the Hon. O. H. Wallop, who was with me, killed forty-eight in about two hours' shooting each afternoon as the birds flew past. On Sept. 22, 1906, Mr. H. B. Wiley and Mr. C. F. Hedges (of Miles City) killed 80 teal of both kinds, in about equal numbers, between daylight and 8 A. M. on the Yellowstone. Three years previously Mr. H. B. Wiley and Mr. Al. Jordan shot 61 ducks between daylight and 12 o'clock, noon, on the Yellowstone, which were almost all teal. Mr. J. H. Price has also shot numbers of both kinds on Locate Creek, Custer County. Mr. Dan Bowman has seen the nests and young of this species on Fallon and Beaver Creeks, Custer County, and Mrs. W. S. Haley has seen the young on Taylor Creek, Dawson County. Green-winged Teal breed regularly on Cow Creek in Dawson County.

17. **Querquedula discors**. BLUE-WINGED TEAL.— Common everywhere during migration. While it is certain that these ducks breed on islands of the Yellowstone, as pairs may be seen throughout the summer, I have never actually discovered a nest. On September 27, 1904, a Blue-winged

BADLANDS ON THE YELLOWSTONE RIVER, MONTANA.

PINE HILLS AND BADLANDS ON YELLOWSTONE RIVER AT JUNCTION OF COTTONWOOD CREEK, DAWSON COUNTY, MONTANA.

Teal was killed by striking against the wire cable of the ferry boat at Terry. On May 18, 1905, in a ride down the Yellowstone from west side of Fallon to Conlin (7 miles) four hundred and fifty ducks were examined and counted through binoculars. Of these twelve were Gadwall, six Widgeon, six Mallard, the remaining four hundred and twenty-six being composed of Shovellers and Blue-winged Teal.

18. **Spatula clypeata**. SHOVELLER.— Common, arriving about end of March or beginning of April, associating with other ducks, chiefly Pintail, Green-winged and Blue-winged Teal. Many remain all the summer and frequent the unsheltered prairie ponds. I have seen them as late as the middle of July in these exposed situations, when they are tame and unsuspicious, but I have not found a nest. When a party of Shovellers are feeding on a prairie lake the adult drakes have a curious habit of constantly raising themselves in the water by balancing on their tails.

19. **Dafila acuta**. PINTAIL.— Common but transient. According to my records, kept since 1889, one of the commonest ducks on the spring migration. Pintail never remain long, even when unmolested, and on this account are seldom shot. While reported from most parts of both counties they prefer alighting near the large streams, and Mr. J. H. Price has never seen them in his locality (Knowlton). Terry flat is a favorite resting place. On my return trip from the Missouri Brakes, in April, 1890, when hosts of wild-fowl were seen, the Pintail outnumbered the others and were numerous on the Powder River where I lived.

I have several times seen a flock of these graceful ducks arrive at close quarters. Although much larger than Green-winged Teal, their light and graceful evolution resemble the latter, when, attracted by water, they swoop down to it as if to settle, but again shoot upwards. If satisfied that there is no danger they straggle into the pool, uttering a very soft low quacking, and immediately on arrival begin washing, playing, feeding, and walking about.

Mr. J. Alex. Fraser (of Glendive) informs me that he saw about a thousand migratory Pintails, in different bunches, on one day of September, 1906, at Al. Stillson's ranch on Cow Creek, Dawson County, where some of these ducks breed and are protected by the proprietor.

20. **Aythya americana**. REDHEAD.— Not common. Occasionally observed on Yellowstone; thirty seen September 26, 1903. Mr. J. H. Price has twice seen Redheads on the smaller creeks. Mr. Dan Bowman has seen them "once or twice."

21. **Aythya affinis**. LESSER SCAUP DUCK.— Tolerably common. Scaup are fond of frequenting the reservoirs of J. B. Kempton, near Terry, four miles from Yellowstone. Twenty-three seen on Yellowstone May 7, 1905.

22. **Clangula clangula americana**. AMERICAN GOLDEN-EYE.— Not common. Occasionally seen on Yellowstone. Twelve haunted the vicinity of the Fallon ferry for some weeks during October, 1903. Thirty observed flying up Yellowstone September 26, 1904, and ten seen flying down October 19, 1906.

23. **Charitonetta albeola**. BUFFLE-HEAD.— Captain Thorne records this duck as rare. I have not noticed it. Mr. H. B. Wiley (of Miles City), who has had considerable experience of duck shooting on the Yellowstone informs me (*in lit.*) that he has never seen it.

24. **Somateria dresseri**. AMERICAN EIDER.— Mr. Charles Freer of Glendive assured me that an Eider Duck was shot there in 189? and identified by a Norwegian.

25. **Erismatura rubida**. RUDDY DUCK.— Captain Thorne mentions a flock of about forty observed April 21, 1889. I have not seen it but Mr. H. B. Wiley has shot a few of this species on the Yellowstone.

26. **Chen hyperborea**. LESSER SNOW GOOSE. — Rare. Transient. April 7, 1890, on Big Dry River, Dawson County, several seen. In spring of 1892 on Powder River, three seen. One of these was wounded by Mr. E. Coggshall with a rifle and lingered on the river but was not secured. November 12, 1903, eight seen flying south. September 12, 1904, eight flew within gunshot of the ferryman's house at Terry.

27. **Chen rossii**. ROSS'S SNOW GOOSE.— Captain Thorne killed a goose of this species on April 25, 1892.

28. **Branta canadensis**. CANADA GOOSE.— Common on migration. Very few geese breed here now, compared to the numbers that did so formerly, in the tops of broken tree-trunks, in hollows of partly decayed trees on ledges of precipitous cliffs, and the islands of rivers. In 1892, about one hundred goslings were hatched on the Lower Powder River alone. Here, in 1890, I was shown two goose nests in the high branches of cottonwoods, and, during June, 1893, a goose sat in a like situation at Jack Selby's lambing camp on Powder River.

Although in my experience and that of Mr. Dan Bowman, geese generally repaired the deserted nests of Swainson's Hawk, I know of two authentic instances when they were observed to build the entire nest for themselves amidst the branches.

When nesting in trees the goose carries her young on her back, like the Eider Duck from the rocks in the Orkney Isles.[1] In the late nineties a goose nested every year in a hollow cottonwood by the Yellowstone on what is now my land. The nest was about six feet from the ground and composed almost entirely of down and feathers from the goose's own body.

Mrs. A. Smith of Fallon hatched eight eggs from this nest under a hen and kept the goslings for two years. She informed me that if two clutches of eggs were removed the goose would, nevertheless, lay a third set. For four years (1903–06) a pair of geese reared a brood near this place and the young were seen by me and other observers. Although the nest was undoubtedly on the ledge of a vertical cut bank above the Yellowstone it was not discovered until June 1, 1906. At this time the goose, after laying eight eggs, had deserted it, on account of a landslide which had

[1] See 'A Fauna of the Orkney Islands' by Harvie-Brown and Buckley, who published my notes on this subject.

partially covered up the nest. The average date for the spring arrival of the Canada Goose at Terry is March 27.

29. **Branta canadensis hutchinsii**. HUTCHINS'S GOOSE.— Rare. On October 4, 1903, twenty of these small geese flew low over me as I waited on the north bank of the Yellowstone for my wife who was being conveyed across by the ferryman. All obtained a good view.

30. **Olor buccinator**. TRUMPETER SWAN.— Rare. About May 1, 1884, Mr. Dan Bowman saw ten or twelve swans resting on the Powder River just after sunrise. On October 27, 1905, an adult male Trumpeter Swan was shot by a boy on the Yellowstone at Tusler, near Miles City.

31. **Botaurus lentiginosus**. AMERICAN BITTERN.— Not common. Occurs regularly on migration.

32. **Ardea herodias**. GREAT BLUE HERON.— Common in both counties.[1] (Plate VIII, Fig. 1.)

33. **Grus canadensis**. LITTLE BROWN CRANE.— An irregular fall migrant occurring in flocks of from ten to one hundred and fifty. This is the common Sandhill Crane of this region, *Grus mexicana* being much rarer. On September 24, 1894, a large flock hovered for some time above my ranch house in Custer County, with the intention of alighting, when I could not afford time to watch them. In September, 1898, a regular invasion of southward bound flocks took place at Terry. The inhabitants pursued them with every description of weapon but only one was shot — by J. C. Braley, with a rifle at three hundred yards. When fired at with a rifle the birds would fly only about half a mile and again alight, so that the fusillade could be continued at intervals. The only possible way of obtaining specimens is from concealment in the corn fields which they frequent. The cranes always flew low, generally within shot from the ground of a heavy shoulder gun, and in a straggling manner, although during migration they rise to a great height. They continued to arrive in the neighborhood of Terry for three weeks (until October 10) when all had left excepting a small flock. If undisturbed the cranes fed in the morning and evening, strongly recalling turkeys in general behavior; their stately manner of walking and drooping tertiary plumes causing them to present a striking appearance.

34. **Grus mexicana**. SANDHILL CRANE.— Rare. May, 1892, one caught with a fish hook, baited with a frog, by Oliver Van on Fallon Creek, as he informed me. At that time Sandhill Cranes were reported numerous in that locality. September 22, 1893, flocks were seen on Powder River, which ran dry and the birds were attracted by the stranded fish. Mr. Dan Bowman, who was familiar with these birds in Missouri and Nebraska, has only seen them twice in Montana.

35. **Rallus virginianus**. VIRGINIA RAIL.— Captain Thorne records a male killed August 10, 1888.

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[1] See Cameron, Nesting of Great Blue Heron in Montana. Auk, Vol. XXIII, 252.

36. **Porzana carolina**. SORA.— Tolerably common. One killed against telegraph wire (Terry), September 12, 1901. Another impaled on barbed wire fence (Terry), September 7, 1903. My grayhounds have flushed it from sage-brush, and I have seen it so tame on the spring migration that at first it might have been caught by the hand. There is a small colony nesting in a marsh about two miles east of Terry. I rode there on June 18, 1898, and found the nests which were almost in the water of a grass grown pool, difficult to approach. Two contained thirteen and five eggs respectively. Their owners when disturbed creep about in the adjoining long grass and rose brush.

37. **Fulica americana**. AMERICAN COOT.— Tolerably common. Breeds. In October, 1904, a coot in an exhausted condition was picked up on the prairie by Mr. Lance Irvine, which he conveyed to the ranch kitchen where it soon recovered and was liberated.

38. **Phalaropus lobatus**. NORTHERN PHALAROPE.— Occasional migrant, usually in small numbers. On May 21, 1899, an extraordinary invasion of phalaropes occurred at my ranch in Custer County, six miles south of Terry, when examples of both these species and the next continued to arrive in greater or less numbers until the end of the month. At first the Red-necks predominated, and Mr. H. Tusler, whose ranch adjoins mine on the south, and who was the first to observe their advent, brought me three specimens of *Phalaropus lobatus* on the date above mentioned, shot, as he informed me, out of at least three hundred birds, which included (as I subsequently learned) a few of *Steganopus tricolor*. All the birds were swimming about in shallow lakes, formed by the recent rains, on the prairie. The relative numbers of the two species were subsequently reversed, for, the main flight of Red-necks having passed, only a few were afterwards seen sprinkled among the Wilson's Phalaropes, which continued to arrive daily in considerable flocks. Both species frequented the temporary ponds formed by the abundant rains in the depressions of grass-lands, but seemed to shun the regular creeks and water-holes altogether. At the moment of alighting they were so thickly disposed that a large number might have been killed by one shot, but immediately after reaching the surface of the water they scattered in all directions over the pond. The Wilson's Phalaropes, both when feeding and when disturbed and circling on the wing, constantly uttered a low croaking, which at close quarters might be compared to the much louder note of the Sandhill Cranes, or, at a distance, to the faintly heard barking of a dog. On the other hand, I have heard them give a shrill and totally different call of indecision or satisfaction on their first arrival, when hovering above a pool. Both species gave the impression of extraordinary activity as they fed greedily on a species of gnat which swarmed close to the surface of the water. To catch these gnats they swam about with incredible swiftness moving their necks from side to side, or backwards and forward, incessantly. In every flock of Wilson's Phalaropes the females greatly outnumbered the males.

The stomachs of the phalaropes examined contained minute stones, grass, and the black gnats above alluded to, mashed to a pulp. The eggs in the ovaries of the females were extremely small, not much larger than pinheads; in only one was there an egg the size of a pea. (Condensed from 'The Ibis' for January, 1900, page 67.)

39. **Steganopus tricolor**. WILSON'S PHALAROPE.— Occasional migrant. See above.

40. **Recurvirostra americana**. AMERICAN AVOCET.— Uncommon spring migrant. In the spring of 189? two specimens were obtained on Powder River at the ranch of Mr. William Ferdon and are now in his possession.

On or about May 1, 1904, eleven avocets alighted in the mud of the north shore of the Yellowstone between Terry and Fallon. Mrs. W. S. Haley, wife of a ranchman living on the river bank, shot an adult female which she gave me.

On May 7, 1905, I watched, through binoculars, a flock of twenty-two avocets on the Yellowstone near Terry for a considerable time. The avocets appeared anxious to leave but were afraid to do so as a pair of Peregrines wheeled overhead. The former flew in low circles over the river, and, uttering shrill cries, alighted in deep water swimming until they could wade. Many were in immature plumage while others had a complete cinnamon neck and head. On May 16, 1906, I saw an avocet in splendid plumage at Mr. W. S. Haley's dam.

41. **Gallinago delicata**. WILSON'S SNIPE.— Tolerably common. Mr. J. H. Price informs me that it breeds, and he has seen the downy nestlings at his ranch on Locate Creek. A few birds remain during the winter.

42. **Actodromas maculata**. PECTORAL SANDPIPER.— Rare. Mr. J. H. Price gave me one of a pair of Pectoral Sandpipers which he shot while duck-shooting in a snow-storm on October 18, 1905. Although an ardent wild-fowler, whose Montana experience dates back to the eighties, Mr. Price had never before met with this species but identified it by means of Chapman's 'Color Key.' Three days later, on October 21, I saw a Pectoral Sandpiper at the edge of J. B. Kempton's reservoir near Terry.

43. **Actodromas bairdii**. BAIRD'S SANDPIPER.— Captain Thorne mentions this bird as rare. I have not seen it.

44. **Actodromas minutilla**. LEAST SANDPIPER.— Irregular migrant. Numerous at the time of the invasion of Phalaropes, beginning May 21, 1899, and consorting with them.

45. **Ereunetes pusillus**. SEMIPALMATED SANDPIPER.— Captain Thorne records this sandpiper as "Common in spring." I have not come across it.

46. **Limosa hæmastica**. HUDSONIAN GODWIT.— Rare. A female Hudsonian Godwit in transition plumage was shot by George Tusler at his brother's ranch near Terry, on May 10, 1899, and brought to me for identification. This was in the spring of the memorable flight of waders described in 'The Ibis' for January, 1900. The skin was sent to Professor

M. J. Elrod of the University of Montana. I saw a godwit on April 7, 1890, near the Crow Rock, Dawson County, but could not ascertain the species.

47. **Totanus melanoleucus**. GREATER YELLOW-LEGS.— Not common like the next. I saw numbers on Tongue River in the fall of 1892. One shot on Powder River in the fall of 1889.

48. **Totanus flavipes**. YELLOW-LEGS.— Common in fall.

49. **Helodromas solitarius**. SOLITARY SANDPIPER.— Common in fall.

50. **Symphemia semipalmata inornata**. WESTERN WILLET.— Irregular migrant. May 25, 1902, a flock of eleven willets alighted near the Terry ferry boat and George Tusler (deputy sheriff) killed an adult male with his revolver. The remaining ten uttered loud shrill cries but did not go far away. May 27, 1903, six willets were seen at the edge of the Yellowstone. September 5, 1903, when my wife and I were in a buggy, seven willets flew up the road towards us and alighted at a waterhole half a mile from Terry. September 8, 1903, we saw nine willets standing in the Yellowstone. Mr. J. H. Price has never met with this bird and Captain Thorne reports it as "rather rare in spring. About twelve seen in all."

51. **Bartramia longicauda**. BARTRAMIAN SANDPIPER.— Common, arriving the middle of May. These sandpipers are nowhere so abundant in Custer County as on the big prairie flat, some twenty-five miles across, which extends from about four miles south of Terry to the pine hills. Numbers breed here, and two or three pairs bred annually upon my ranch in Custer County or that of Mr. H. Tusler adjoining, which mark the northern boundary of this plain. The birds made no nest but laid four eggs in the center of a tussock of grass, which are invisible from outside, and above the level of the ground upon the pressed down herbage. In one instance the sitting bird was so tame that she remained only two feet from her eggs when flushed and would peck at an extended forefinger. Nestlings are seen early in July.

The Bartramian Sandpiper appears less numerous in Dawson County.

52. **Actitis macularia**. SPOTTED SANDPIPER.— Common. Breeds along the Yellowstone, as I have seen the young birds but never happened actually to discover a nest. On May 18, 1905, counted twenty Spotted Sandpipers along the Yellowstone shore.

53. **Numenius longirostris**. LONG-BILLED CURLEW.— A very common summer visitor, arriving about the middle of April. Curlews nest all over the prairie and in the fenced pastures of ranches, the young being all hatched out before the middle of June. Eggs have been found as early as the first week in May. Curlews lay four eggs on the dry open uplands, in a hollow of the plain lined with dried grass; they are difficult to find unless a flock of sheep or bunch of horses are driven over the ground which force the sitting birds from their nests. The incubating curlews will allow horses to all but tread upon them, and they look so like "buffalo chips" as to be easily mistaken for them at a little distance. If the female

runs along the ground with humped back and slightly elevated wings she has eggs close by; if, on the other hand, she flies towards and around the intruder screaming vociferously, the young are hatched out and concealed in the vicinity. On their first arrival and during the nesting season, when they are usually met with in pairs, curlews are exceedingly fearless but as soon as the young can fly (at the end of July), they collect into large flocks, prior to migrating, which may contain a hundred birds in each. They are then shy and difficult of approach but as far as I am aware nobody ever tries to shoot them here. (Plate VIII, Fig. 2.)

Curlews feed chiefly on grasshoppers, but there is an abundance of beetles and grubs for them before the first named mature, about the middle of June. I have seen the nesting curlews make flying attacks at Swainson's Hawk and the Marsh Hawk with their long bills, just as they drive away Richardson's Skua in the Orkney Islands.[1]

54. **Charadrius dominicus**. AMERICAN GOLDEN PLOVER.— Occasional fall migrant. On September 9, 1896, I saw a flock of thirty or more Golden Plover on a bare flat near my ranch in Custer County. I remained motionless and they wheeled around my horse within easy shot. On the 16th of the same month, at the same place, I observed a small flock of fifteen birds which crouched to the ground as I rode up to them. They seemed very tame and only flew a few yards. On September 23, I again saw eight birds in the same locality. Their call is similar to that of the European form.

55. **Oxyechus vociferus**. KILLDEER.— Abundant. One of the earliest summer visitors, arriving at the end of March. Killdeer are very tame and confiding and will rear young close to ranch buildings, although a stony slope near water is a favorite nesting site.

56. **Podasocys montana**. MOUNTAIN PLOVER.— A regular summer visitor, but scarce. Two or three pairs breed annually on the prairie dog towns in the vicinity of Terry. Their eggs are very hard to find, but I have seen an egg as early as May 23. The birds spend most of their time on the ground, where they run with incredible swiftness, fully twice as fast as a Killdeer, which alone would always attract attention to them. If forced to rise these plover fly very low, and run for some distance upon alighting, when they will allow themselves to be pressed closely before taking wing again. When disturbed they have a curious habit of collapsing, or shrinking into themselves, and stretching their bodies to the full height alternately. On June 15, 1898, I was out with three grayhounds looking for a coyote when I saw a pair of these plovers in the center of a prairie dog town. I at once began to look systematically for a nest, walking in circles, starting from my horse, which stood wherever he was left, the three dogs lying beside him. Having searched in this manner for nearly three hours without result, or even seeing either plover again, I was beginning to lose heart when a single plover again appeared showing

[1] See Harvie-Brown and Buckley, A Fauna of the Orkney Islands, p. 225.

extreme agitation at my approach. Running with a trailing wing she would fall over and lie struggling on the ground, which induced the dogs to chase her away, and convinced me that she had young close by. I again made the dogs lie down by the horse and began to search in small, gradually increasing circles, but not without opposition on the part of the distracted parent which sought by feints and struggles to engage my attention. All the time she kept up a short, shrill whistle, dropping at intervals to a harsh note, and appearing to utter these sounds without opening her beak.

Finding her efforts unavailing she would run close up to me, and flinging herself down, remain motionless with outspread wings, in the hope that I would desist from my search to pick her up. By her manœuvres she assisted me to find her nestlings and I soon saw two little pale yellow birds, spotted with black, together with an egg, on the bare ground, for there was no pretence at a nest. The two nestlings were perfectly helpless and unable to stand, which seems to indicate that some days must elapse before the young of this species can run.

57. **Pediœcetes phasianellus campestris**. PRAIRIE SHARP-TAILED GROUSE.— Common. (Plate IX, Fig. 2.)

In the pairing season the Sharp-tailed Grouse indulge in an extraordinary 'play' which is called a 'chicken dance' and roughly may be said to take place every day, excepting during stormy or threatening weather, from about April 10 to May 10. In the spring of 1900 I had unusual opportunities for watching it, the grouse having chosen for their playground the further bank of the creek intersecting my ranch, which here sloped from a high steep cliff on the south to a level sage brush flat on the north. As the channel of the creek was deep it was possible by using great care to approach close to them without being observed, and on two occasions I got within twenty yards, being at one time only about six yards from some of the birds. Not until April 18 did I actually observe the grouse, although their dance was begun at least a week earlier, as could be told by their cooing, which was audible about a mile on a still day. There was an open space in the sage brush which was thick on the down creek or north side, and to this point they flew by twos and threes until twenty had assembled on the playground, not to mention the hidden spectators. The average time for the beginning of the dance was about 4.30 P. M., which continued until six or much later if there were many interruptions. What little I had previously seen and read had led me to suppose that the play of this grouse would be an excitable, confused performance very different from the regular evolutions actually witnessed, and which I have endeavored to set down here as accurately as possible. At this date (April 18) the ball is opened by a single cock making a run across the open space as fast as he can use his legs, the tail being inclined stiffly over the back, while the wings are dragged, so that a large white area is exposed behind. The vivid yellow supraciliary fringe is erected, and, all

FIG. 1. GREAT BLUE HERON.
Nine weeks old.

FIG. 2. NEST OF LONG-BILLED CURLEW.

FIG. 1. SHARP-TAILED GROUSE.
One of two that entered a wired-in 'garden patch' and believed themselves to be unable to escape.

FIG. 2. NEST OF MOURNING DOVE IN SAGE BRUSH ON PRAIRIE.

the feathers of the neck standing on end, a pink inflated sac is disclosed. At the same time the head is carried so low as almost to touch the ground, so that the bird is transformed in appearance and, as observed through binoculars at some distance, looks to be running backwards. He then returns at full speed when another cock comes forward towards him, both advancing slowly, with vibrating tails, to meet finally and stand drumming their quills in a trance with tightly closed eyes. After perhaps a minute one bird peeps at the other, and seeing him still enraptured, resumes an upright graceful carriage, anon stealing gently away. His companion is thus left foolishly posing at nothing, but presently he too awakes, and departs from the arena in a normal manner. Meanwhile the remaining cocks, one after another, take up the running till all have participated, but the end of each figure seems to be the same. Two birds squat flat on the ground with their beaks almost touching for about twenty minutes, and when they do this they are out of the dances for that day. As the grouse make their runs at intervals the play is spread over an hour and a half, but when this was at its height the small open space, about thirty yards in diameter, presented an indescribable scene. While three or four of the metamorphosed cocks might be 'running,' the pairs already formed would squat flat with outspread wings, and other cocks, facing each other, would drum in ecstasy, oblivious to their surroundings. At the same time an ardent suitor would now and again chase a hen across the playground until she leaped high in the air, upon which the pursuer would seem to forget her and make a 'run.' After watching for about an hour the hens too made little runs but displayed no air sacs. All this time the spectators of the dance, concealed by sage brush, kept up an incessant *coo, coo, coo,* as if to applaud. The proceedings were quite amicable throughout. I did not see the slightest inclination to fight on the part of the performers: on the contrary, if two cocks collided, as sometimes happened, they would squat in apologetic fashion. After upwards of an hour of running, posing and flopping, the dancers became exhausted, and were constrained to pant painfully, a result not to be wondered at, seeing that during the play period 90° in the shade was registered. The dance appears to terminate by some bird, either a late starter or one more vigorous than the rest, being unable to find a partner to respond to his run. Having assured himself of this, he utters a disgusted clucking, and all the grouse fly away at intervals as they complete their term of squatting.

On April 29 and 30 I again watched the play which was still being energetically carried on although the runs were, of course, fewer, the drumming with the tail louder, and the crouching process more prominent and prolonged; whereas earlier in the month only two or three pairs squatted, now seven couples nestled together as close as possible, and whenever a disengaged bird approached, one of the pair rose to drive it away with the regular chicken dance run. I concluded that these affectionate pairs were birds mated for nesting although no act of pairing was witnessed by

me. On the 30th, the grouse were put to flight three times, once accidentally by me and twice by a Marsh Hawk, but all flew back again to the same spot within a few minutes. When suspicious, warning clucks from the onlookers stopped the play, and the grouse drew themselves to their full height, resuming their natural trim appearance. Under these circumstances there is no difference between the sexes, the pink sac characterising the males being invisible, which increases the difficulty of distinguishing them and making accurate observation. After days of watching it was evident that the birds, though running at each other like game cocks, never fought, while several males (presumably young) remained passive spectators. The hens to some extent participated in the dance. Subsequent to the above observations I watched the grouse closely to discover if they really paired, and concluded that they do so in an irregular manner. The cocks forsake the hens as soon as incubation commences, and, lending no assistance in rearing the young, may be met with in small parties of about half a dozen.

58. **Centrocercus urophasianus**. SAGE GROUSE.— Abundant on the sage plains of both counties. Formerly nested upon my ranch in Custer County, and in 1902 I tried to rear some by setting two clutches of eggs under hens. Out of fourteen birds hatched, only two reached maturity. To the best of my knowledge Sage Grouse have never been reared in captivity before. The strip of country in Dawson County enclosed by the Musselshell, Yellowstone, and Missouri Rivers, and extending westward from the junction of the two latter, is a chief haunt of Sage Grouse, several localities, such as 'Sage Hen Springs' and 'Sage Hen Creek,' being thus named on account of the abundance of these birds. During the first half of April the males repair to a regular 'playground,' but it is a difficult matter to observe their love antics on account of the encompassing sage. However, on April 7, 1896, my wife and I happened to ride close upon a number of old cocks, near our ranch, which were engaged with their play in a small open space. They never fought nor threatened each other but strutted or paraded before some hens concealed in the sage bushes, and were entirely occupied with a most grotesque rivalry. By ruffling up all their feathers, spreading their tails, and dragging their wings along the ground they looked much larger than they really were, while they produced a rattling sound with their quills after the manner of turkey-cocks and peafowl. At the same time they continuously uttered a kind of whistling challenge, and distending their necks by means of their air sacks erected an enormous white ruff. As the playground was small the eight or nine cocks upon it were in imminent danger of a collision, but for the ten minutes that we watched them, this did not take place, nor were there any moments of ecstatic oblivion for which some game birds are famous. As will be seen from the above their courtship is rather a display than a 'play,' thus differing from the performance of the Sharp-tailed Grouse, which is described under that bird.

59. **Zenaidura macroura**. MOURNING DOVE.— Abundant, arriving about May 1 and usually leaving first week in October. Nests indifferently on the ground or on trees. (Plate IX, Fig. 2.) A Mourning Dove hard pressed by a hawk took refuge in Mr. Dan Bowman's buggy as he was driving along.

60. **Cathartes aura**. TURKEY VULTURE.— Rare. Mr. Dan Bowman informs me that during the fall of 1883 Turkey Buzzards were incredibly numerous in eastern Montana, and roosted in thousands on the Powder River in the vicinity of his ranch. The birds constructed their nests in the cottonwood trees along the river, the stench from these rookeries being so great that it was almost impossible to approach. He tells me that the young were fed by regurgitation. Without doubt it was the prodigious slaughter of bison (*Bison bison*) which attracted the birds, for while the southern herd (estimated at four millions) had already ceased to exist, the northern herd (containing about a million and a half) was wiped out in 1883.[1] From this time on, the Turkey Buzzards have become more and more scarce until in the present year (1906) they must be regarded as accidental wanderers. Mr. D. Bowman fixes the fall of 1887 as the date when they ceased to nest here — a colony of about 75 birds then occupying the pines of the East Powder River divide — but Mr. J. H. Price, who lives in this district, has observed young birds since.

I take the following records of Turkey Buzzards from my diaries:—

August, 1892, 4 seen gyrating above Tongue River, Montana.

April 10, 1893, 5 on my ranch in Custer County.

July 29, 1894, 6 near Fallon at a dead calf; two so gorged as to be unable to fly.

October, 1896, 1 shot by Mr. Walter Lindsay at carcass of horse on Mizpah Creek.

June 12, 1898, 1 remained on my ranch in Custer County for three days.

April 18, 1906, 2. A Turkey Vulture arrived on my ranch in Dawson County and was afterwards joined by a second, when the pair must have nested in the adjoining bad land as they remained there during the summer.

61. **Circus hudsonius**. MARSH HAWK.— The commonest hawk here with exception of the Desert Sparrow Hawk. Males arrive about the end of March and females somewhat later, all leaving again in the middle of October. For many years a pair nested below my ranch house in Custer County, and always received strict protection. This bird is the common 'Henhawk' of eastern Montana and is the most pertinacious of any in attacks on the poultry yard. Young Marsh Hawks weighing about ten ounces will endeavor to disable a chicken weighing a pound, by pecking it on the head and striking on the back at the same time with the feet, their strong wings enabling them to keep directly above it no matter where the prey may run. Birds of the year, through inexperience, are the most

[1] See 'The Extirpation of the American Bison,' Hornaday, 1889.

daring, and my wife has taken a screaming pullet from the claws of one of them which found the prize too heavy to lift.

62. **Accipiter velox**. SHARP-SHINNED HAWK.— Tolerably common summer visitor and undoubtedly breeds, although I have not found its nest. For its size it is astonishingly bold. During September, 1904, a Sharp-shinned Hawk frequented my ranch in Dawson County and kept all the birds away which were accustomed to come to the cattle troughs. It would dash at the flocks of Crossbills and the other birds with tremendous velocity, scattering them in all directions. We have even seen the little hawk strike at some fowls close to the house, which weighed four pounds, sending them screeching and flying for shelter. It would stoop at Flickers, following them into trees, and strike the trunk of a pine simultaneously with and beside the screaming fugitive without making any attempt to seize it. I therefore came to the conclusion that these and previous attacks on the poultry were made purely for sport.

63. **Accipiter cooperi**. COOPER'S HAWK.— Rare. In sixteen years I have only seen this hawk three times. At my ranch in Custer County, one, on September 13, 1893. At my ranch in Dawson County, one, which flew out of a belt of pines on April 30, 1903. At the last named place on August 7, 1905, the loud screaming of a flock of Piñon Jays attracted my attention to a Cooper's Hawk by which they were menaced.

64. **Accipiter atricapillus**. AMERICAN GOSHAWK.— An irregular fall migrant in both counties. According to my records it is of more common occurrence than Cooper's Hawk. I never saw a Goshawk myself until September 22, 1903, but Mr. J. H. Price (who used to go hawking with one in England), has seen the bird several times during the last seventeen years when shooting ducks in the fall. On October 18, 1905, Mr. Price was after ducks in a snowstorm at his ranch near Knowlton when a Goshawk seized, and carried past him, a shrieking Blue-winged Teal, just as he was on the point of firing at the latter's companions. The reports caused the hawk to drop the teal into some buck brush but it remained near and, as usual, was of great assistance to the shooter. With a hawk in the neighborhood, ducks rise at close range and are afraid to go clean away. Shortly after the above incident Mr. M. M. Archdale was shooting ducks on his ranch, which adjoins that of Mr. Price, when the same or a similar hawk compelled a flock of teal to return twice to the water from which they had been originally started. He thus made a good bag. On November 19, 1905, my wife saw a Goshawk sitting on the ground watching the poultry at our ranch in Dawson County. On this occasion the hawk did no harm.

During the end of September and beginning of October, 1906, however, a Goshawk frequented this ranch, and killed four pure bred Plymouth Rocks of which we kept a number in two different places. The hawk appeared to lurk on a pine-covered hill about half a mile away, in full view of the windows, from whence, if the coast was clear, it swept across

the creek and alighted in the immediate vicinity of the fowls. The latter were well accustomed to watch for hawks, and any large bird seen in the sky would send them scurrying for shelter. The Goshawk, however, invariably flew so low, that, like the prowling coyote, it was unperceived until the moment of the fatal dash. The fowls became afraid in consequence to leave the immediate vicinity of their houses, and on October 4, the hawk killed a pet white hen at the fowlhouse door, which made its third victim. Despite our rule never to kill wild birds on the ranch, my wife, now that her pet hen was slain, desired to shoot its murderer. On my part I wished to spare this splendid but too audacious hawk, which, although most wary at other times, showed extreme reluctance to leave its prey. As the captured fowls weighed upwards of five pounds each it could not carry them off but ate the back or breast of its victims where they lay. A few days after the white hen episode the Goshawk killed a very fine cockerel and was observed by me almost in the act. To escape its enemy the terrified fowl had run under some young cedars which would have saved it from a Prairie Falcon or Peregrine, but were no protection against the relentless Goshawk which followed and seized its prey within the cover. So great was the strength of this cockerel that it ran an uphill distance of fifteen paces towards the fowl house, burdened with the clinging hawk, ere it fell dead. The Goshawk kills its prey by constriction of the feet, and it is quite certain that the squeeze combined with the shock is rapidly fatal to fowls. On this occasion the hawk must have been unusually hungry, for when deprived of its booty, it alighted in a cedar nearby to watch the proceedings. Returning with a gun I carefully stalked the bird and fired two ineffectual shots as it flew away. The hawk then rose to a great height and, after flying some distance, boldly returned to its haunt on the pine-covered hill above mentioned. Early next morning I observed the bird again fly to the spot where the cockerel had been killed and managed to disable it by a long shot which apparently fractured the ulna of the left wing.

Not being severely wounded the hawk managed to flap into a cedar but was here captured and placed in an empty barn. When handled (of course with thick gloves) the Goshawk from the first made no sort of attempt to show fight, but only looked at me reproachfully with its orange eyes. The plumage and size (which equals the largest dimensions given) determine it to be an adult female. On October 18, 1906, a second Goshawk appeared, resembling the captive in all respects, but did no damage until October 27 when it was surprised in the act of eating a large hen close by the fowl house. The victim was first struck about fifteen yards behind the building but had run this distance down hill dragging the hawk. The evening was exceedingly calm, and the hawk having gorged itself on the entire breast of the fowl in a place walled in by low hills found great difficulty in rising above them. Indeed I think I could have thrown my stick and killed the bird as it was flapping awkwardly "for want of air to

waft her." In thirty-six hours the hawk had returned to the fowls, but, being anxious to avoid the necessity for injuring another of these fine birds, we shut up the poultry with the result that in a few days the Goshawk left in disgust. (Plate X.)

65. **Buteo borealis calurus**. WESTERN RED-TAIL.— Common. In arrival and departure this handsome hawk coincides with *B. swainsoni*, and it may therefore be said to reside here only for three months, the time necessary to rear its progeny. Being seldom killed, this hawk is quite a common bird, breeding throughout both counties, when it chooses an inaccessible cottonwood, the nest being placed as high as possible while the thick foliage renders it all but invisible. I have thus been able to follow the life history of these birds, and one pair nested for several years about two miles north of my ranch in Custer County. I have never known these hawks to have more than two nestlings and, in the case of two nests at least, investigation showed that these were fed upon Meadowlarks, cotton-tail rabbits, and snakes, provided chiefly by the male. Mr. Dan Bowman and Mr. H. Tusler informed me that they took rattlesnakes but in any case, no remains of poultry nor game birds were even found.

66. **Buteo borealis harlani**. HARLAN'S HAWK.— Rare. A hawk of this species was obtained in North Dakota in the spring of 1890 and identified by Drs. P. L. Sclater and Bowdler Sharpe. It is now in the British Museum. I have since seen a similar hawk in Custer County, and one in Dawson County on August 25, 1905.

67. **Buteo swainsoni**. SWAINSON'S HAWK.— Common. My first introduction to these hawks was in April, 1890, when an extraordinary invasion of them — probably nearly two thousand birds — alighted around the ranch where I was staying on the west bank of the Powder River. They came in the afternoon from a southerly direction and, for a time at least, followed the downward course of the river, as a neighbor living above reported the enormous hawk army which flew over. The wide river bottom where the ranch is situated is thickly overgrown with cottonwoods, and the fence of the saddle horse pasture all but joins the buildings. When the last birds had arrived, the trees inside this pasture were simply black with them; but as there appeared to be numbers beyond, I saddled my horse in order to reconnoitre further. This precaution was necessary on account of the Texan cattle herds outside the fence, which were quite unaccustomed to seeing a pedestrian, and would either stampede or follow him about with menacing demonstrations. Having ridden round the fence I found that not only were the trees filled with clusters of buzzards, but that the ground below was covered with them sitting in rows among the cattle, the sight surpassing anything I had hitherto seen in bird life. All were obviously worn out and appeared asleep; but those on the ground, if closely approached, were not too tired to fly up and join their comrades in the trees. In color, as far as could be determined, these buzzards exhibited every shade of brown while some inclined to a more chestnut hue.

Others again appeared black, or almost black, showing the melanistic form, and a very few individuals were a uniform lavender, or bluish ash, like the male Marsh Hawk (*Circus hudsonius*). I have never obtained but two birds in this rare dress, but I feel satisfied it is the one ultimately assumed by the adult male, which through a long succession of browns moults into a mature plumage of lavender with white throat spot. Of this cinereous phase I can find no reference in ornithological works, where the old males are invariably, but I believe quite erroneously, described as brown. The immature birds, both male and female of the same age, also exhibit endless difference in coloration, and the attempt to trace their progress to maturity has perplexed even so eminent an authority as Dr. R. Bowdler Sharpe who states (*in lit.*): "The changes of plumage in these buzzards are terribly difficult to follow." I returned to the ranch for a 250 Holland rook-rifle and walking out in the pasture killed twelve of the Buzzards, at the same time restraining the cowboys from indulging in a general practice with their winchesters. The small crack of the rook rifle, and the headlong fall of a bird from its perch, had no effect upon its companions, but I believe a shot gun would have caused them all to take wing further on. In a letter published in 'The Ibis' (Oct., 1891, pp. 623–625), I gave the estimated number of buzzards at about a thousand; but it became obvious afterwards that two thousand would have been nearer the true count, as twenty trees each containing fifty birds give a total of a thousand without including all those on the ground and in more distant cottonwoods. I may add that my wife and Mr. Coggshall (owner of the ranch), who were present during the flight only saw the birds in the saddle horse pasture, and computed their number at a thousand within the enclosure. Six out of the twelve buzzards were sent to Dr. P. L. Sclater and are now in the Natural History Branch of the British Museum. On the following morning all the buzzards had vanished as completely as the Assyrian host, and such an opportunity is never likely to occur twice to any one observer, although I have since seen other small migrations flying over at a considerable height — one flock over the town of Miles City. Some members of the flocks which arrive in April remain here to nest in June, the young being hatched out early in July, and are ready to take wing at the end of that month. As soon as this happens all the buzzards, fortunately for them, leave this part of the country.

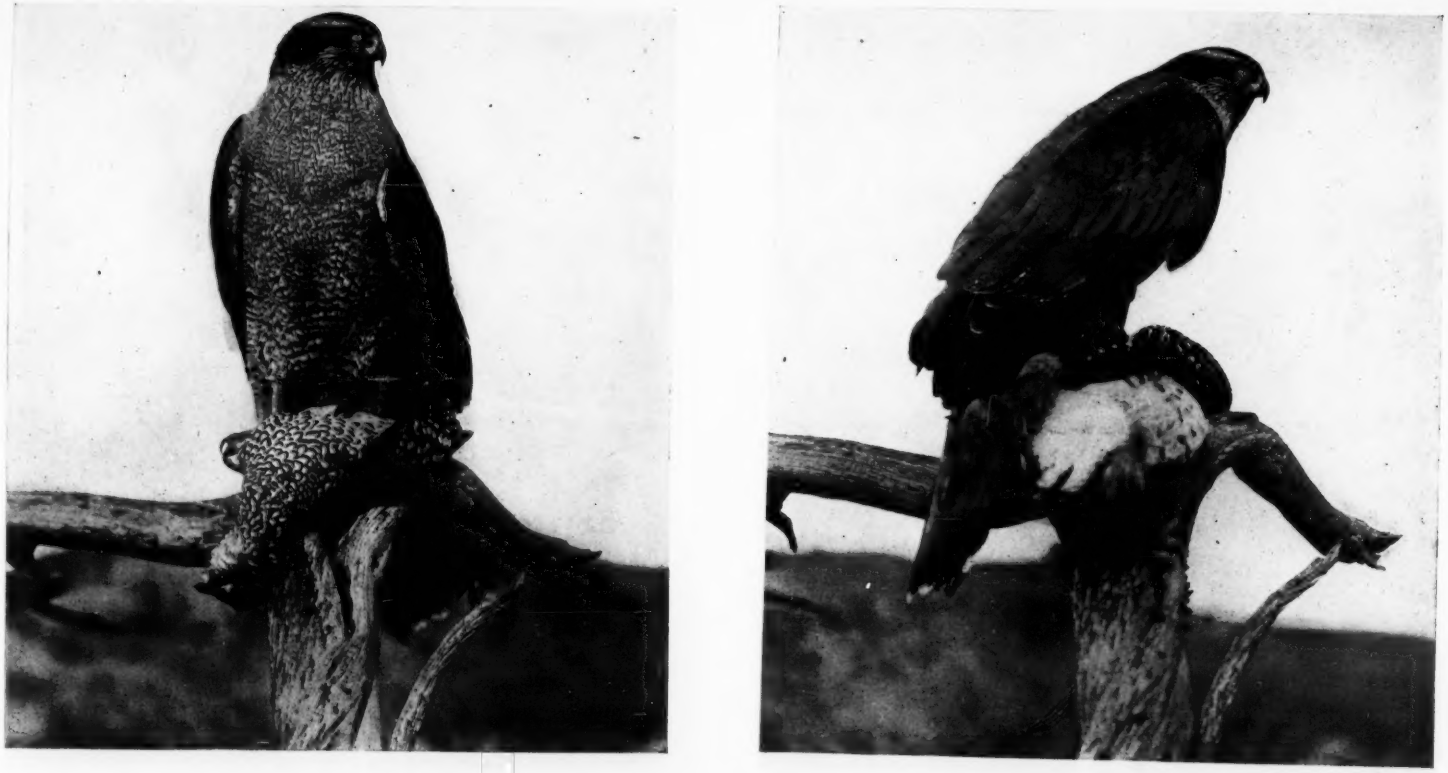
68. **Archibuteo lagopus sancti-johannis**. ROUGH-LEGGED HAWK.— Formerly a common winter resident but, like the Golden Eagle, is becoming very scarce from traps and poison put out for wolves. Also observed in spring and fall. I have seen many specimens of these hawks in Montana which perished in the above mentioned manner. Some were indistinguishable from three in my collection of Orkney birds while others were again quite different. Here, prairie dogs appear to be the favorite food of this species and the next, so that both should be strictly protected. I believe that a few pairs breed in the badlands. On May 14, 1898, I discovered

what I supposed to be a nest of this species, as a Rough-legged Hawk was frightened from the spot by my grayhounds which had been chasing a coyote. When I returned on another day the nest was deserted and I took the single egg.

69. **Archibuteo ferrugineus**. FERRUGINOUS ROUGH-LEG. — Resident but never common. Appears to be larger than the last named. A female of this species was caught in a wolf trap near my ranch at Terry which I had preserved. Another female was shot from her nest on a badland butte near the same place by A. Bright on May 9, 1899. I visited this eyrie, took the two eggs, and also saw the male bird. In May, 1905, another pair nested on a cottonwood about six miles from my ranch in Dawson County but a hungry shepherd boiled and ate the three eggs. (Plate XII, Fig. 1.)

70. **Aquila chrysaëtos.** GOLDEN EAGLE.— Formerly very common but has become almost exterminated as a result of the high bounties placed on wolves. In the early years of 1890, eagles had not learned to associate danger with the presence of man and their tameness was indeed remarkable. For three years, 1903,–04,–05, a pair of Golden Eagles nested near my ranch in Dawson County.[1] The female of this pair met a melancholy fate in attempting to carry off what was beyond her strength. All the shepherds had received strict injunctions from their employers not to interfere with the eagles, but in this case the patience of one man was tried too far. He narrated how from some distance away he saw an eagle stoop at one of the dogs, and hang above it as raptorial birds are wont to do when attacking ground game. The dog, not paralyzed like a hare, at the proximity of the great bird, ran towards its master, when the hovering and expectant eagle fixed one foot on each side of the collie's throat and endeavored to bear aloft the shrieking animal. The shepherd described how during the few minutes that he was running toward the struggling pair and trying, incidentally, to find a stick, the eagle made frantic efforts to carry away the dog, which seemed unable, when clutched in this manner, to make any attempt to free itself. According to the story, the bird was flying all the time, in any case flapping its wings, and, although prevented from rising by the weight of the quarry, it was able to drag the helpless dog to and fro. The eagle had, in fact, too good a hold for her own safety and was ignominously killed by blows on the head with a stick. This event happened at the end of March when the male found another mate, and with her made a new eyrie in a different situation. The dog, which weighed about thirty pounds, afterwards recovered, though rather badly mauled by the eagle's claws. A pair of Golden Eagles have also nested in a tall pine tree for five years (1902,–03,–04,–05,–06) at Mr. J. H. Price's ranch near Knowlton, Custer County, and have been strictly protected. Two eggs taken from this eyrie are the handsomest I have ever seen.

[1] See Cameron, Nesting of the Golden Eagle in Montana. Auk, Vol. XXII, No. 2, April 1905.



GOSHAWK, WITH A SHARP-TAILED GROUSE.

FIG. 1. SPARROW HAWK AT NESTING TREE.

FIG. 2. SPARROW HAWK WITH DEER MOUSE.

FIG. 1. NEST OF FERRUGINOUS ROUGH-LEG ON A BADLAND BUTTE.

FIG. 2. YOUNG WESTERN HORNED OWLS.

71. **Haliæëtus leucocephalus**. BALD EAGLE.—Occasional visitor. Formerly bred here. A pair of Bald Eagles were found nesting in a high pine on the head of Horse Creek by Mr. Dan Bowman in 1893. Unfortunately the female was killed by a bullet as she sat on the edge of her nest, an immense platform of sticks. Mr. Dan Bowman, who was one of the first settlers in this part of Montana, has supplied the following further information. In the early eighties Bald Eagles, while not common, were frequently seen on the Powder River. In 1883, a pair had a nest in a cottonwood tree on the east side about two miles above the rocky ford at the mouth of Coal Creek. Bowman, being camped nearly opposite, could observe the birds, and once saw a lamb carried to the eaglets by one of the parents. In 1885 he again saw an adult Bald Eagle perched on a rock, about two miles north of this nesting site, and approached to within fifty yards. A few days after one was shot by a Mexican, working for Frank Archdale, when Bowman identified it beyond a doubt by the tail and shanks. He has also twice seen dead Bald Eagles on the Powder River, which had died from eating poisoned bait put out for wolves. Mr. J. H. Price has also seen Bald Eagles at different dates, which were probably the same birds observed by Mr. Bowman who lives in the same locality. I have twice seen an adult Bald Eagle on my ranch in Dawson County, — March 17, and November 6, 1905. On the second occasion I was riding up a thinly wooded hill, when the splendid bird floated over me, unsuspectingly, just clearing the straggling pines.

72. **Falco mexicanus**. PRAIRIE FALCON.— Tolerably common resident. For two summers, 1905–06, and probably for many years before I discovered them, a pair of Prairie Falcons have nested half way up one of the highest buttes in the picturesque badlands at the mouth of Cottonwood Creek in Dawson County. At this place there is a sheer wall of peculiar white sandrock which breaks away very easily and disintegrates into a substance as fine as chalk. The cliff contains several holes and the falcon places her eggs upon the white powdery sand in the largest of these under a flat projecting rock. The eggs may be seen either by ascending from below with the aid of a rope and steps cut with a hatchet, or from above by descending the butte and lying full length on the flat rock already mentioned. The latter method, however, requires a cool head. In my experience there are no birds so shy as these, and none whose nest is so difficult to find, or who desert it so easily. In 1906, at this particular eyrie, two eggs were laid by May 10, but the birds carefully avoided the place if a human being was anywhere in the vicinity. When the nesting site is approached, the falcons at first 'ring up,' uttering shrill chattering cries, but should the intruder remain stationary, they endeavor to mislead him as to its true position by circling above the top of another high butte, both wailing like cats. Should the eyrie be actually visited, the birds disappear altogether. For fear that the female might forsake her eggs in the nest above referred to, the cavity containing them was merely looked

into from a yard away at the above date and not visited again until June 15. They were nevertheless found to be deserted. The falcons had chosen another site in a still more inaccessible cliff above the river where they were left undisturbed. The Prairie Falcon is very bold in its attacks upon game birds and poultry, seizing them either on the ground or on the wing indifferently. I have known it to prey upon Mallards, both kinds of Teal, Sharp-tailed Grouse, and domestic fowls. In attacking full grown hens the falcon suddenly checks its stoop about a yard above the victim over which it hovers before making the final dash. Meanwhile the shrieking fowl runs wildly about and there is often time to scare away the freebooter which then mounts with incredible rapidity. At the time of their migration Green-winged Teal seem to be the favorite quarry, and Mr. J. H. Price has twice shot one of these ducks from a flock pursued by a Prairie Falcon before it had made its stoop. This dashing marauder attends upon the Teal as they move up or down the creeks, and in winter is the relentless persecutor of the Sharp-tailed Grouse. I have even seen the falcon watching on a pine for the grouse to emerge from the snow at its foot. On February 7, 1895, an adult Prairie Falcon (now in my possession) was shot by a neighbor, J. C. Braley, at Terry, under peculiar circumstances. His wife was cooking beetroot and threw out the refuse on the snow, when the falcon, passing overhead, stooped to the beetroot which it probably mistook for raw meat.

On September 21, 1904, at our ranch in Dawson County, my wife and I watched a Prairie Falcon in the act of carrying off a Meadowlark which was screaming and struggling in its talons. As the falcon rose level with the hill-tops, a Golden Eagle sailed majestically over in close proximity to it, thereby appearing to fluster the other which allowed its victim to escape. Old birds of *F. mexicanus* may always be distinguished from the young by their yellow feet and legs, as in immature examples these are slate color.

73. **Falco peregrinus anatum**. DUCK HAWK.— A scarce resident. In 1905, there was an eyrie of peregrines not far from the Terry ferry boat crossing. I did not see the eggs, which were laid in an inaccessible fissure about six feet below the overhanging edge of a cliff which towers above the Yellowstone. By crawling along a projecting spur of gumbo it was possible to obtain a good view of the rock face and of the falcon as she flew from beneath, but nothing else could be made out except the excrement of the birds. It would appear that neither the Duck Hawk nor the Prairie Falcon make any pretence at a nest here, the eggs being deposited in the hollows which are often found excavated in the vertical face of hard sandrock.

74. **Falco columbarius**. PIGEON HAWK.— Tolerably common fall migrant. Since 1899 I have many notes of this hawk, but perhaps some of them would properly apply to the next species. I saw five Pigeon Hawks together twice, on August 20, 1899, and July 21, 1904, at which time they flew low over my buggy. I have also twice seen a Pigeon

Hawk dash after a bird (the first time a pigeon the second time a small bird) into an outbuilding right through our astonished party. On September 5, 1899, I witnessed an exciting chase by one of these hawks after an Arkansas Kingbird, which, however, evaded its stoop every time and finally found safety in the brush. My wife has seen several of these hawks sitting on the telegraph wires at Blatchford, and Mr. J. H. Price has also observed them in this locality.

75. **Falco richardsoni**. RICHARDSON'S MERLIN.— Rare migrant. During August, 1904, a hawk of this species came several times to drink at the cattle troughs on my ranch in Dawson County. Captain Platte M. Thorne mentions two specimens which he obtained in the fall of 1889.

76. **Falco sparverius phalœna**. DESERT SPARROW HAWK.— Summer visitor, everywhere abundant. Commonest hawk in eastern Montana. Arrives about the end of March, but all the birds are gone by the middle of October. As a rule the Sparrow Hawk lays her eggs in deserted woodpecker holes but on one occasion she appropriated the nesting site of a flicker after the latter had begun to lay. (Plate XI.)

Upon first arrival Sparrow Hawks are seen to stoop boldly at small birds on the ground, but, as far as my observation goes, they seldom take feathered prey when grasshoppers are plentiful. They hawk for the latter in the early morning, or just before sunset, but do no foraging in the heat of the day when the grasshoppers are most in evidence. About twelve large flying locusts are required to supply a Sparrow Hawk with a meal; as these birds also kill numbers of mice, they are most beneficial and should be strictly protected. The head of the grasshopper is first plucked off and swallowed, the wings and inside are next thrown away, when the bird eats the remainder. I have never known Sparrow Hawks take the chicks either of domestic fowls or of the Sharp-tailed Grouse, even when ample opportunity has been afforded them. Mrs. Gifford of Fallon shot a Sparrow Hawk which arose from among her chickens with, as she thought, one of them in its claws. The poor bird's victim, however, proved to be an English Sparrow. When Sparrow Hawks chase large birds, such as Doves and Meadowlarks, it would seem to be chiefly in play. They are very bold in attacking the different species of Buteo and Marsh Hawks which may approach their nesting site.

77. **Asio wilsonianus**. AMERICAN LONG-EARED OWL.—Resident. Not common. On October 11, 1895, one (female) was shot by the cook of the L. U. cattle outfit on Little Dry Creek, Dawson County, who gave it to me. During October, 1899, a family of two old and five young owls came every night to my haystacks in search of mice at my ranch near Terry, Custer County. They were very tame, and if I rode up after dusk would playfully swoop at my horse. On May 11, 1905, a Long-eared Owl was flushed from a cedar patch at my ranch in Dawson County, and a pair of the birds frequented the same locality in April, 1906. In May, 1905, a pair nested in the hollow of a high cottonwood at the Yellow-

stone ferry crossing at Terry. On June 1, two nearly full-feathered young could be seen sitting in the tree, but as they were the objects of much attention the parents removed them on the night of the second.

Mr. J. H. Price is familiar with this owl in his locality (Knowlton), and informs me that several birds of this species frequented Mr. G. M. Kirwan's ranch, on Tongue River, during the winter of 1906–07.

In fall and winter these owls occupy cavities in the high cut banks of the badlands; Messrs. Archdale found a Long-eared Owl frozen to death in a badland hole. When this owl is in flight, a brown spot shows conspicuously on the buff lining of the wings underneath the primary bases.

78. **Asio accipitrinus**. SHORT-EARED OWL.— Erratic winter visitor. Tolerably common some winters, in others not observed. These owls lie very close, and are flushed from sage brush precisely as from the heather in the Orkney Isles where they were very common. In either case, they are difficult to see without a dog. On January 10, 1902, my wife picked up a dead Short-eared Owl, in good condition, by the Yellowstone. It must have been frozen to death in the extreme cold of the previous December, as there was no other way to account for its demise. A pair of these owls wintered on my ranch in Dawson County, during 1902–03 and were last seen on April 16. May 7 is the latest date on which I have observed this species.

79. **Megascops asio maxwelliæ**. ROCKY MOUNTAIN SCREECH OWL.— Captain Thorne mentions three seen by him. I have not observed this owl here.

80. **Bubo virginianus pallescens**. WESTERN HORNED OWL.— Common. A resident and predominant bird, nocturnal in habit, and to be seen or heard at all seasons wherever there is a tree for it to rest in. Nests indifferently in the river valleys or pine hills. A pair of Hoot Owls reared their young on my ranch in Custer County for many years, repairing the same nest, often but a storm swept fragment, each spring in the same box-elder tree. Almost before winter is fairly over (about third week of March) the female begins to lay the two or three white eggs upon which for about three weeks thereafter, she will sit alternately with the male, who shares the duties of incubation with his spouse. While one of the pair is on the nest, the other sits silent in a tree, its plumage assimilating so closely to the bark, whether box elder or willow, as to render the bird invisible even when the tree is leafless. The young are hatched successively from about the middle of April onwards, and the first hatched nestling may precede the latest arrival by an interval of a week. By the second week in June they can fly. So pugnacious are the owlets that the strongest finally drives the others from the nest to occupy a branch near, where they pretend to fight but avoid the real issue by twirling round and hanging head downwards by their scansorial feet. Hoot Owls have an ill repute as chicken stealers and are shot at sight on neighboring ranches; but the fact that their raids are not commenced till dusk serves generally to protect them.

They were observed to kill half grown turkeys belonging to J. C. Braley, of Terry, in the summer of 1902. The season's menu for our own particular owlets consisted, however, mainly of cotton-tail rabbits, two of which have been seen in the nest at one time. I once saw a young jack rabbit in the nest. (Plate XII, Fig. 2.)

81. **Nyctea nyctea**. SNOWY OWL.— Erratic winter visitor. In some years abundant; in others not seen. During the winter of 1889–90 there was a regular invasion of Snowy Owls, and J. D. Allen, taxidermist, Mandan, N. D., had five hundred sent to him for preservation, which I examined in May, 1890. During the same winter Captain Thorne has records of eighteen in his locality (Fort Keogh) alone. On my trip to the Missouri Brakes from Miles City, in April, 1890, these owls were commonly seen all along the route traversed. I have frequently met with them since in all parts of both counties but never again in such numbers. Snowy Owls alight indifferently on a tree, on a fence, or on the ground, and, in the latter situation, allow a very close approach by a horseman before taking wing. Mr. W. S. Haley informed me that a pair of these owls remained over two summers on Pine Creek, Custer County, and frequently flew into the hollow of a dead cottonwood where they were supposed to have a nest. It is unfortunate that he did not further investigate.

82. **Speotyto cunicularia hypogæa**. BURROWING OWL.— Common resident. In summer these owls have a habit of making short flights along the wire fences in front of horses, perching on the wires until approached quite close.

83. **Claucidium gnoma**. PYGMY OWL.— Rare. A specimen of this owl was obtained in the timber on Tongue River at Miles City by a workman in Moran's saddle shop, where I saw it mounted on January 4, 1895. It was afterwards presented by Mr. Moran to Mr. J. E. Rickards, governor of the State of Montana.

84. **Coccyzus erythrophthalmus**. BLACK-BILLED CUCKOO.— Rare summer visitor, arriving about the end of May. About two pairs nested regularly upon my ranch in Custer County, and the groves resounded with their cries. Mr. J. H. Price, who has a thorough knowledge of Custer County, tells me he never heard them elsewhere. I have heard cuckoos, however, on Ten Mile Creek, ten miles distant, where exactly similar conditions prevail. (See introduction.) In June, 1900, a pair of cuckoos chose the center of a choke cherry for their nest, which was entirely concealed from view by festoons of flowering clematis enveloping the bush. On June 13, when I first discovered this beautiful nest it contained six blue eggs, but unfortunately five young Marsh Hawks were hatched out at the same date on the creek below. On June 19, five nestling cuckoos were hatched but had fallen a prey to the Marsh Hawks by the end of the month.

85. **Ceryle alcyon**. BELTED KINGFISHER.— Not common. Summer visitor to Tongue River, Powder River, and the Yellowstone. Mr. Dan Bowman informed me (*in lit.*) June 4, 1905, that a pair were nesting on

Powder River. On July 31, 1905, when observing a heronry on an island of the Yellowstone, in Dawson County, a kingfisher flew to the island and was apparently one of a pair nesting there. On September 21, 1906, I saw a kingfisher take a fish from Seven Mile Creek (Glendive).

86. **Dryobates villosus**. HAIRY WOODPECKER.— Tolerably common. Must breed in the pine hills, as it is found there all the year round. On Cedar Creek, which runs into the Yellowstone, near Glendive, its short sharp screech and flight in loops attracted my attention nearly every day when hunting deer. According to Mr. Jenkins, this form is *D. v. monticola*. (See Jenkins's 'Variation in the Hairy Woodpecker,' Auk, Vol. XXIII, p. 168.)

87. **Dryobates pubescens orecœcus**. BATCHELDER'S WOODPECKER.— Tolerably common. Resident. Must breed in the pine hills. This woodpecker is much in evidence during winter on cedar fence posts, in which it bores numerous holes searching for food under the bark.

88. **Ceophlœus pileatus**. PILEATED WOODPECKER.— Rare. One seen April 25, 1894; another August 12, 1898.

89. **Melanerpes erythrocephalus**. RED-HEADED WOODPECKER.— Abundant. Commonest woodpecker here, nesting indifferently in river valleys or pine hills. Arrives about middle of May, leaving about middle of September. A pair which came regularly to my water troughs in Dawson County, during August, 1904, were accompanied by only a single young one. When a hawk appeared they made an extraordinary commotion, and others of the brood might have been taken by hawks. In June, 1905, three pairs of Red-headed Woodpeckers nested in small holes of high cottonwood branches close to the ferryman's house at Terry, and many pairs used the holes in dead pines on my ranch (Dawson County) and vicinity for the same purpose.

90. **Colaptes auratus**. FLICKER.— Common. Breeds in pine hills or river valleys indifferently. Nested on both my ranches.

91. **Colaptes cafer collaris**. RED-SHAFTED FLICKER.— Common. Captain Thorne sent twenty-five skins to Dr. J. A. Allen, American Museum of Natural History, who replied as follows: "The series as a whole is one of special interest, the specimens all coming from localities within the range of the interbreeding of *C. auratus* and *C. cafer*. There is not a specimen in the whole series that is strictly *C. cafer*, though several approach true *cafer* very strongly. The greater part are much more *cafer* than *auratus*. In a few the characters of the two species are about equally represented. In one or two the *auratus* characters prevail. No two specimens are quite alike, while the combination of characters is often peculiar and very interesting."

(*To be continued.*)

THE CROSSBILLS OF NORTHEASTERN WYOMING.

BY REV. P. B. PEABODY.

THE data set forth herein are much too meager for publication, greatly interesting as are the underlying facts to which they refer. What is here chronicled is hence laid before students of bird biology with suggestive and stimulative intent. It seems incredible that the apparent difficulties in the way of a more intimate knowledge of the nesting conditions that prevail with some of our mid-western races of Red Crossbills should continue to baffle those that have attained skill, through experience, in the unraveling of bird mysteries.

On the shale hills of Weston County, Wyoming, and on the rocky slopes of the Bear Lodge Hills of Crook County, the ever-present bull-pine shelters or nestles, according to their whim, the nomadic flocks of the large-billed form of crossbills that are known as the Bendire Crossbill (*Loxia curvirostra bendirei*). This race is no less irregular in its periodic and seasonal movements than are others of its congeners. Except for a brief time in the very late summer, when the seeds of the bull-pine begin to fail, there would seem to be no time during the annual circuit when the Sierra Crossbill may not be found in northeastern Wyoming. It is rather sparingly resident; and, except for the seasons when it freely breeds, it is irregular in its favored haunts.

Interested, at all times, in the habits of all birds, the writer has, of late years, given special attention to questions of the breeding times of many species of North American birds. He has collated from printed records and gathered from private sources all eligible records for the nesting times of all the crossbill races. For *L. c. minor*, the extreme dates available for record are March 10 and August 6. Of late a September instance (Brewster, Maine) has come to light. For *L. leucoptera*, January 20 and June 12, and for *L. c. stricklandi* (in Mexico), a period extending back into January (perhaps December), and forward to about March 15. (See 'Zoe,' Vol. IV.)

By all analogy, the Sierra Crossbill should nest during February

and March. By all record, the utmost we have to swear by is the vague statement by the late Professor Knight, of the University of Wyoming, that, "in 1897, while in the Bear Lodge Mountain, [he] saw [the Bendire Crossbills] in flocks of several hundred"; that it was "the 24th of July"; and that "the young were full grown." (Univ. Wyoming Bull., No. 55, p. 120). (It is not impertinent to add, that never, under any circumstances, do we in our day, see, on the Bear Lodge Mountain, flocks of crossbills exceeding fifty in number.)

With these inconclusive data for his only guide the writer, during the spring and early summer of 1904, made diligent search for the nests of the Sierra Crossbill; spurred on, with quickened enthusiasm, by the spirited chatterings and the ardent searches for unexhausted pine cones on the part of ever-present and often-numerous birds. And yet the writer does not recall a single instance of any act remotely interpretable as connected with nesting or the care of the young during the entire season of 1904. On December 20, 1904, however, one remarkably sunny and mild day, just before sunset, a most beautiful but previously unheard song came wafted, ventriloquially, to my back door from some near-at-hand bull-pine. The singer was sought out and proved to be a male Bendire Crossbill. He was sitting on the very top of a small pine, quite absorbed in his own tone-productions. For the warblings were real *tones*, though decidedly weak, fitful and soliloquial. They might be characterized as weak but immeasurably sweeter paraphrases of the brilliant song that *L. c. minor* sings, atop the tall spruces of Saint Louis County, Minnesota, during early June.

Scanty attention was vouchsafed the crossbills during the time intervening between December 20, 1904, and the first of February, 1905. Oblivious of the fact that wonderful and fascinating events might be going on, the while, in the crossbill world near by, the writer patiently awaited the time indicated in the books for the probable celebration of the nuptials of his very interesting crossbill friends. On the early morning of February 2, 1905, the writer made the following record in his notes: "This morning, at eight o'clock, with the thermometer at thirty degrees below zero, I saw one of a small flock of about eight crossbills feeding another. The feeder proved to be a male; and I must hasten to look for nests; if, even at so early a date, a crossbill is feeding his mate."

Crossbills were, in the following days, fairly abundant and easy to observe. Yet go where I would, search where I might, over the hills and through the cañons of the vicinage of Newcastle, Weston County, no trace could I find of anything like domestic occupations among the busy crossbills. But on the morning of February 12, but forty feet or so from the small pines whereon I saw the feeding operations of February 2, I found, to my incredulous astonishment, a female crossbill feeding three young in a bull-pine sapling not ten feet high, on the very corner of my church lot.

"A male feeding his mate, indeed," grumbled I to myself, as to the feeding incident of February 2 in the very heart of town. The birds were not four feet from my head, and I had every opportunity of watching them critically for four or five minutes. The three fledglings were very hungry (young crossbills are *always* hungry), and sat on the pine boughs, about their mother, waiting for the filling and the subsequent un-filling of her throat with the bull-pine seeds. One youngster, after being partially filled up, as to his crop, removed a foot or so from the rest of the family and began intently to pry at the bark of the limb on which he sat. (This operation I have seen enacted several times since; and I am quite convinced that it has much to do with the nascent crossing of the mandibles.[1]) Eager to secure at least a single example of these young (still believing the rearing of these birds, at so early a date, to be unusual), I searched for them a half-hour later, they having in the meanwhile impulsively flown from the sapling of their morning luncheon to some spot unknown. Fortunately, they were found on the same lot and but fifty feet from the spot where they had just been seen, perched, quite as before, on another pine sapling. With a mop-stick as my weapon, I tried to secure one of the young crossbills. It sat a few inches from its mother, awaiting her good offices. At the stroke of my weapon the fledgling flew — though he was the

[1] There seems to be no apparent law regarding the direction in which the lower mandible crosses the upper. Of fifteen specimens respecting which record has been made, ten were males and five were females. Four of the females had the lower mandible crossing to the left; with one specimen having the mandible crossing to the right. In six males the crossing was toward the right, and in four toward the left. Thus eight specimens had the mandible crossing to the left, and seven to the right. No regularity thus appears: and it is a fair question for speculation whether or not the curvature is not *produced*, indifferently, by each juvenile, according to its own impulses.

nearer to the point of my stroke — while the mother fell at my feet. Repeatedly did I see the father of these young, that same morning, at his task of double parenthood. His round of pasturing seemed very narrow, being confined, in the main, to the few small pines about my residence.

Two days later I secured two of the young crossbills. Of these two, one, the female, had both mandibles as yet absolutely straight; while her brother had a slight crossing of the mandibles at the tips.

Actions of the parent crossbills, repeatedly studied at this time, revealed somewhat of mode and habit. By light of this added knowledge one learned to catch the meaning of acts previously meaningless. Thenceforward it became possible to watch not a few family parties at their feeding; and also to measure the purpose of flights previously without apparent meaning. It thus became plain that the parent crossbills would alternate in making long excursions after pine seeds for the young; the latter remaining, the while, in the manner of so many fledged birds, motionless, but in no sense silent, in the very spot where the departing parent had left them.

The note of the young crossbills, that characteristic note whereby all fledglings direct their homing parents to the hungry throats that await them, is unlike any other utterance of the kind. It is a clear, mellow, cheery, yet rather querulous, utterance. Its ordinary form is a monosyllabic *peet*; or a dissyllabic *peetiv*; which, iterated about once a second, in irregular groups, may become, under stress of unusual eagerness, a resounding *pee-tiv-tiv*. This call, in varying forms and intensities, may be heard all the summer long, where the crossbill families are found; being heard, at times, even when the family is on the wing; and even, as I am quite sure, uttered by birds at least a year old. Indeed, a slight variation of it finds place in the nuptial song of the male crossbills. (The coherence, for long periods, of the crossbill families, is indicated by the fact that female No. 2126 was shot in the act of feeding No. 2125, which is manifestly a bird of the previous season.)[1]

Up to April 17, no crossbill nests were found, although minute search was made in all neighboring bull-pine areas affected by the

[1] See next footnote.

birds. On the evening of the date in question, at the end of a day spent in the study of Piñon Jay nesting habits, a junco of doubtful identity and interesting mien attracted my attention midway up the side of a steep, heavily wooded cañon near Newcastle. The junco led me a merry race, but was overtaken just at the point where a little gorge ran downward through the small pines. In a moment a sharp, anxious *chill-chill-chill* note resounded, a few feet away and quite above me, in the pines. A female crossbill was flitting about, most excitedly, with tail a-jerk, quite English Sparrow fashion. A prompt hiding amid scanty covert on my part made no change in her goings and comings; quickly marking the spot, I ran back a hundred yards for my note-books. On returning to the crossbill site, all things near at hand were found to be silent and deserted. A few moments of search, in the dim light, gave no clue, but the instinct of telepathy proved a better help. In a very slender six-inch pine, about sixteen feet high, something like a nest appeared some twelve feet from the ground, slightly concealed by sparse pine branchlets. At a sharp rap on the stem of the tree, the female crossbill left the nest. The eager antics of the climber alarmed her not a little, and she kept flying about, ever iterating her excited, *chill-chill-chill*; a call which I had never heard before, save when, a few weeks previously, a pair of birds assailed me with the same call, in a cañon bottom, after the loud, echoing discharge of my gun. The crossbill nest contained two young. These, to the best of my judgment, were two or three days old. The nest was, in all essentials except that of the placing — which was in a semi-vertical fork — like typical nests of the Piñon Jay. It was basally formed of fine twigs and plant stems, and was lined with grass and hempen fibers. The outer diameter is about seven inches; the inner is one and one fourth inches, and the cavity two inches across. While I was examining the nest and young, the mother disappeared; and the delighted observer hastened away, for the night air was chill for the callow young. On April 22, I found the mother crossbill brooding. Upon a rap on the tree-stem, she flew away and did not return. One young had disappeared, while the other had doubled in size, during the interim of five days. On the day following I found the nest deserted and empty. My surmise is, that the Piñon Jays, which were passing continually by in their

townward scavenging for the benefit of their young, had picked up the two young crossbills, one after the other, in the probable absence of both parent birds. It is even possible that the youngsters were removed to places of safety by the mother crossbill herself.

No later nests were found; but families, with young noisily clamoring for food, were heard all summer long. In the great majority of cases, the broods were of three only; but two broods, at most (and possibly but one of these), exhibiting four young birds. Examination of my small series of crossbills shows that birds of a year old, and a little over, were sexually neutral.[1] These were constantly in company with families containing young. These family groups were noticed throughout the summer of 1905, until September. On the Bear Lodge slopes of Crook County a few such were seen early in September; the mature birds even yet exercising parental care over the juveniles, though not probably feeding them. The young still clamored to be fed; but no act of feeding was clearly and indisputably seen.

True to the erratic habit of their kind, the Wyoming crossbills were notably few in number during October, 1905. The same condition prevailed into November; an ardent and repeated search among the shale-hill pines revealing but a scattered bird, here and there. Determined, however, to fix the time of nascent breeding conditions, I sought the crossbills at stated times to the end of November. On the 27th I was rewarded by finding what

[1] It should be stated here that both Dr. Bishop and Dr. Dwight consider certain supposedly year-old birds, from the region exploited in this article, to be strictly birds-of-the-year. One such Dr. Bishop believes to have been hatched from November eggs. Other specimens in similar transition plumage were being fed by parents. If the Doctors be right in their judgment in these cases, the problem of nesting time for crossbills in Wyoming is even more complicated than one had previously supposed; while the long time of parental feeding becomes thus the more incredibly lengthened. Of course it would be quite impossible for a juvenile crossbill to feed itself before the mandibles were fully developed; yet it becomes a matter of surprise that birds in transition plumage, with fully developed mandibles, should follow parents and clamor for food, being apparently, in such cases, sometimes actually fed.

It should be added that a fair series of juveniles has been taken in the Wyoming hills for the express purpose of throwing light upon the length of time required in the maturing of the bill of the crossbill. Birds with mandibles about one third developed, while wearing still the juvenile plumage, were taken in late March, April and June; while all birds taken in transition plumage were of perfect beak-development. Study of records for birds taken do not show that these transition juveniles were any more abundant in March, for example, than they were in late May.

appeared to be a family of the past summer, still together. The adult male was still not an adult, if the reader will permit the contradiction. His plumage was still semi-juvenile. Yet he was in breeding condition, the testicles being of nearly maximum size The testicles of the Red Crossbill are relatively very small; and, moreover, the two diameters are nearly equal. Measurements taken at various times during the breeding season gave the diameters .20 and .19 as about the maximals. For the November 27 male just referred to, the diameters were .17 and .19. The mature female of the November 27 family had the ova slightly nascent. The two juveniles were both females with ovaries inactive. All four birds were slightly moulting. Crossbills continued few into December, in both counties. A mature female taken December 9 had two or three ova enlarged about one diameter Data obtained from December to late March were both meager and inconclusive. However, a male taken March 10 had the testicles quite shrunken (only .15 × .17), while his mate (which was shot accidentally) was manifestly incubating.

Four days later, March 14, in a driving snowstorm, I found a finely plumaged male feeding a fully fledged young female. These two birds were taken a few days later, in the midst of intense cold. No sign of the mother bird was seen, nor did a careful search reveal a second nesting.

All through the summer of 1906, as careful and exact a study as possible was made of the actions of the breeding birds. It was found that, while normally as tame as one might expect from all analogies, both males and females were very shy and restless during March, April and May. The excited *chill-chill-chill* note was often heard; and individuals of both sexes might be occasionally seen and heard perched high on the summits of dead-topped pines, with every possible manifestation of nervous unrest and anxiety, and after a brief moment, and without apparent cause, flying swiftly away and disappearing in the distance. During the period indicated most birds appeared to be in pairs; those that were not in pairs being adjudged to be non-breeding birds. No nests, whatever, came to light during 1906. Strong effort was made all through the summer to learn the utmost possible as to nesting habits and ways. And yet, notwithstanding an abundance of pine

mast, the birds were everywhere few in numbers and inconsequent in action.

No signs, whatever, were discovered of late summer nesting. Removal from the region of observation made it impossible for me to determine whether or not the crossbills were sexually active during July and August.

CHARACTERISTIC KAMCHATKAN BIRDS.

BY AUSTIN H. CLARK.

United States Fish Commission.[1]

FROM the 17th to the 20th of June this past summer, I was fortunate enough to be in that out-of-the-way and seldom visited town, Petropaulski, Kamchatka, where I had an opportunity to form a close acquaintance with a number of interesting birds which I had previously known only from museum specimens. I reached Petropaulski from Bering Island, after having spent nearly a month in the bleak and desolate Aleutian chain; and the sight of the pretty wooded hills about the town, the broad meadows, and the distant snow-covered mountains, combined with the songs of hundreds of birds all about produced a deep impression, and made me think at the time that there could not exist a more charming spot than this little town in farthest Siberia. The weather during my stay was perfect, warm and summerlike, the sun shining almost all the time, which I was in a condition to appreciate, as the sun is a rather rare sight in the Aleutians, and comfortable days, at this season, rarer still.

The first bird in Kamchatka to attract attention is the Siberian Ruby-throat (*Calliope calliope*), not from its coloration, for it is rather plain, nor for its ubiquitousness, for it is quite retiring, but for its most exquisite song. It is abundant about Petropaulski, and sings all day long, from sunrise to sunset, its song being the most characteristic bird note of the region. It inhabits particularly hillsides grown up to bushes, and bushy patches in the mead-

[1] Published by permission of the Commissioner.

ows, keeping usually on or near the ground, and is very adept at slinking away through the undergrowth when alarmed. The song is usually given from some little elevation, as the top of a bush, or the lower limbs of a small tree, but often from near the ground. Very justly has this bird been called the "Kamchatkan Nightingale."

Next in importance as a songster, and much more often seen, being in fact quite familiar about the town, is the Siberian House-finch (*Carpodacus erythrinus grebnitzkii*). In general habits and song this bird resembles our common Purple Finch (*Carpodacus purpureus*). This species frequents the hillsides, but keeps to the more open places, the higher branches of the small trees, and the tops of the bushes. It is vivacious and restless, never stopping long in one place.

The last of the really characteristic songsters occurring about the outskirts of the town is the handsome Yellow-breasted Bunting (*Hypocentor aureolus*) which is very common, but hardly equal vocally to the two preceding. It is much like the preceding in habits, but less active, and less familiar. An allied species (*H. rusticus*) with a white breast is not uncommon, but I did not succeed in identifying its song.

A near relative of the famous Skylark (*Alauda arvensis blakistoni*) is common in the meadows, its fine song characterizing the more level country behind Petropaulski.

Although not a song bird in any sense of the term, but a bird whose notes are characteristic of this region, as those of its representative are of the western palæarctic region, the common Eastern Cuckoo (*Cuculus canorus telephonus*) deserves special mention. Its loud and clear *cuck'-oo*; *cuck'-oo* was heard at all times, and the birds themselves were frequently seen about the hillsides or clumps of bushes in the meadows.

One of the most curious birds of this region is the Slate-colored Bunting (*Tisa variabilis*). It inhabits the densest alder thickets along the banks of the small streams, keeping on or near the ground, its habits closely resembling those of our Juncos, and sparrows of the genus *Zonotrichia*, to which genus it has been referred by some authors; others have placed it in *Hypocentor*, *Emberiza*, *Fringillaria*; while one suggests that possibly it should be placed in *Spizella*, with our Chipping and Field Sparrows. Recently, however, a

genus has been erected for its reception. In full breeding plumage this bird is almost entirely clear slaty gray, and bears a most striking resemblance to two widely different species, *Phrygilus unicolor* of western South America, and *Junco vulcani* of Costa Rica.

Of the larger species the Slaty-backed Gull (*Larus schistasagus*) is the most abundant, occurring everywhere about the sea-coast, with the Black-headed Gull (*Larus ridibundus*), a close second, although much more restricted in general distribution. The Osprey (*Pandion haliaëtus*) is very common about here, and the large Kamchatkan Sea Eagle (*Thallassaëtus pelagicus*) is frequently seen. The Raven (*Corvus corax kamtschaticus*) occurs here, and is not uncommon, although I saw but one or two. The eastern Carrion Crow (*Corvus corone orientalis*) is numerous, and was breeding at the time of my visit. I found a number of nests, none of them, however, accessible. One of the handsomest birds of the region, and certainly the most conspicuous, is the large Kamchatkan Magpie (*Pica pica kamtschatica*), which is common everywhere, although it is very wary, and manages to keep well out of gunshot.

Whenever I went near any groves of tall trees, I was sure to hear a continuous hooting, somewhat resembling that of the Barred Owl; but when I tried to get close enough to find out what was doing the hooting, it would invariably cease long before I was within range, to be immediately resumed from some distant grove. I suppose the bird was the Siberian Hawk Owl (*Surnia ulula doliata*) which is the only owl known from the country.

About the taller trees also, the eastern Tree Pipit (*Pipastes maculatus*) was common, its song and actions instantly calling to mind our common Ovenbird (*Seiurus aurocapillus*). I met with a number of other species of birds here, but all of much less interest than those mentioned. A word must be said in closing about the pretty Kamchatkan Wagtail, which is very common here, especially about the rocky beaches. It is rather shy and hard to approach, resembling in this, as in its general appearance at a distance, the common Snowflake (*Passerina nivalis*).

I was forced to leave Petropaulski early on the morning of the 20th, for Hakodate, which I did with great regret, as few places which I have visited have so appealed to me from an ornithological point of view as this pretty little Kamchatkan town.

WINTER BIRD NOTES FROM EXTREME SOUTHERN ILLINOIS.

BY JOHN F. FERRY.

THE following notes were made on a short collecting trip to extreme southern Illinois in the interests of the Field Museum of Natural History, Chicago. The time spent was between February 22–28, and the object of the trip was to make as complete a study as possible of the bird life at this season of the year. The region studied was that in the vicinity of Cairo, which city is situated at the juncture of the Mississippi and Ohio Rivers. The area included was about forty-five square miles, and besides Cairo, the villages of Mound City and Olive Branch were visited. The country near the two rivers mentioned is low and flat and is regularly submerged twice each year, at the times of the spring and fall rises of the rivers. Heavy levees for protecting villages and for carrying railroads and highways are practically the only elevations to be seen. At Olive Branch the country is diversified with low wooded ridges and hills and about two miles to the southeast lies a shallow lake of about five square miles area known as Horse-shoe Lake. Cypress is the prevailing growth about it but oaks, sweet gum, sycamore and sassafras form a considerable part of the surrounding forest. Originally the whole region under consideration was one of continuous forest, and much of this primitive condition still remains, although considerable areas have been cleared for farming. Frequent streams of varying size flow in a general southerly direction into the Ohio River. The most important of these is Cache Creek, a mile below Mound City. The soil is mostly a rich alluvial loam, while back from the rivers gravels, sand and clays prevail. The richness of the soil and the prolonged season of summer heat produce a luxuriant vegetation, and trees along the rivers grow into magnificent specimens of their kind.

The weather was changeable, cloudy weather predominating, but for about two hours preceding and following midday warm bright weather usually occurred. The effect of this warmth and sunshine upon bird life was very noticeable, a marked increase in species and individuals being observed during the continuance of

these favorable conditions. Rain fell continuously on the 23d except for part of the afternoon, and rain or mist were the accompaniments of a part of about half the days spent. Occasional touches of green in the meadows showed that the grass was beginning to revive. Frogs were heard croaking on the 24th; on the 26th a black and brown caterpillar (*Pyrrharctica isabella*) was seen, and small winged insects in low bushes on the river banks were seen daily. Through the courtesy of the U. S. Weather Bureau at Cairo, I am able to give the daily condition of the weather.

Statement of Weather, Cairo, Ills.

	Temperature.			Wind.			State of Weather.		
Feb. 1907	Maximum.	Minimum.	Precipitation, inches.	Prevailing direction.	Total daily movement.	Highest daily velocity.	Character of days.	Percentage of cloudiness.	Notes.
22	30	21	T	N E	309	20 E	Cloudy	10	Fresh winds for 24 hrs.
23	42	29	2.30	E	238	16 S E	Cloudy	10	Heavy sleet storm.
24	49	34	.56	N	314	24 N	Cloudy	10	Brisk winds last 12 hrs.
25	45	30	T	N E	218	15 E	Cloudy	10	
26	48	39	.29	E	141	12 W	Cloudy	10	
27	53	34	.0	N E	151	14 E	Cloudy	8	Dense fog 5.30 A. M. to
28	57	44	.04	E	121	11 S E	Cloudy	10	9.05 A. M.

Larus sp?— Gulls flying at a distance from the shore over the Ohio River could not positively be identified as *delawarensis* or *argentatus*; but they were undoubtedly one or the other.

Lophodytes cucullatus (?). HOODED MERGANSER.— Four ducks, undoubtedly of this species, passed just out of gun-shot on Horse-shoe Lake on Feb. 28.

Anas boschas. MALLARD.— Two Mallards were positively identified on Horse-shoe Lake on February 28, and they doubtless formed a considerable part of numerous flocks seen flying overhead at a considerable height. Hunters report them common here during the spring migration.

Spatula clypeata. SHOVELLER.— Four Shovellers were seen on Horse-shoe Lake on February 28. They were very active, either swimming rapidly about or making short, frequent plunges into the shallow water.

Dafila acuta. PINTAIL.— Pintail were probably the most abundant duck at this place. Several flocks were seen flying in a northerly direction

on February 26, and almost daily they were observed in varying numbers. Horse-shoe Lake has several times been the site of an extensive duck-roost largely occupied by these birds. An open space of water was fairly covered with the birds' cast-off feathers.

Branta canadensis. CANADA GOOSE.— During cloudy weather the sonorous honks of the Canada Geese could frequently be heard, but the birds' whereabouts was a matter of mystery. They were probably flying overhead, but they may have been resting on the Ohio River, or on sand-bars, or in neighboring fields. In cornfields hunters had within a few days been successfully decoying them to blinds by the use of corn, shelled and on the cob. They are common in this region during migration.

Fulica americana. AMERICAN COOT.— Four were seen on February 28, at Horse-shoe Lake.

Oxyechus vociferus. KILLDEER.— Ten Killdeers were seen on February 23 in company with a large flock of Robins and a few Meadowlarks, in a wet field. Individuals were seen on February 25–27.

Colinus virginianus. BOB-WHITE.— Common, but each year the season's increase is about killed off by shooters.

Meleagris gallopavo silvestris. WILD TURKEY.— Two hunters and trappers, old residents of Olive Branch, reported a flock of 12–15 of these birds in the immediate vicinity. Several Wild Turkeys had been seen while the writer was in the neighborhood. The home of these birds is in the thickly timbered river bottoms, or in borders of cypress swamps such as are found about Horse-shoe Lake. They frequently resort to the higher timber land or make visits to farmers' fields where they find a scanty supply of last season's grain. Their scratchings are frequently seen in the underbrush. They readily decoy to an imitation of their call. They seek safety by rapid and noiseless running through the underbrush, and take wing only in an extremity. A favorite place of concealment is a bunch of mistletoe.

Zenaidura macroura. MOURNING DOVE.— Two seen on February 27 on Cache Creek, and on the following day two were seen at Olive Branch.

Cathartes aura. TURKEY VULTURE.— Fairly common at this season. Not seen during the coldest weather, February 22 and 23.

Accipiter cooperi (?). COOPER'S HAWK (?).— Three pointed-winged, long-tailed hawks, seen flying high on February 23, were identified as this species with reasonable certainty.

Buteo borealis. RED-TAILED HAWK.— Several seen. One pair's intention of nesting were inferred from their frequent crying and their reluctance to leave a certain portion of the forest.

Haliæetus leucocephalus. BALD EAGLE.— Occasionally seen about Cairo, near the Ohio and Mississippi Rivers. An immature bird was killed about the middle of January near Hough, Mo., thirty miles distant, where the man who showed me the bird in the flesh reported that the birds were abundant.

Falco sparverius. SPARROW HAWK.— One seen on February 26.

Syrnium varium. BARRED OWL.— Two seen, and reported quite common by trappers. They are some times very annoying to trappers by setting off meat-baited traps.

Dryobates villosus. HAIRY WOODPECKER.— Tolerably common, but much less abundant than the following species.

Dryobates pubescens medianus. DOWNY WOODPECKER.— An abundant bird in this region. The males appeared to predominate, as five males and one female were taken.

Centurus carolinus. RED-BELLIED WOODPECKER.— Common. They show a decided fondness for the tall soft-wood timber of the river bottoms. The large proportion of decayed tree trunks in such places is the probable explanation.

Colaptes auratus luteus.— First seen February 23. Tolerably common thereafter.

Otocoris alpestris praticola (?). PRAIRIE HORNED LARK (?). — Two Horned Larks, seen flying overhead on February 25, were presumed to be this species.

Cyanocitta cristata. BLUE JAY.— Common. A disposition to imitate the cry of the Red-tailed Hawk was manifested by the birds of this region. An almost perfect imitation was given by several different jays.

Corvus brachyrhynchos. AMERICAN CROW.— Common.

Agelaius phœniceus. RED-WINGED BLACKBIRD.— Two seen at Mound City on February 23. Quite common at Olive Branch on the 28th.

Sturnella magna. MEADOWLARK.— Common, keeping in small flocks, and wary.

Carpodacus purpureus. PURPLE FINCH.— Tolerably common; feeds on 'buttons' of sycamore tree.

Astragalinus tristis. AMERICAN GOLDFINCH.— Seen at Mound City and Olive Branch.

Zonotrichia albicollis. WHITE-THROATED SPARROW.— Tolerably common. Once, song heard.

Spizella monticola. TREE SPARROW.— Common. One evening about dusk a flock of these birds was seen picking up weed seeds on the ground when it was so dark the birds could scarcely be seen.

Junco hyemalis. SLATE-COLORED JUNCO.— Common, roving through the woods or flitting about shrubbery in flocks. In one grove, free from underbrush and where there was a thick carpet of fallen leaves, I came upon a host of these birds. They were alternately feeding among the dead leaves and flying to the nearest branches, where they poured forth their musical trills. When thirty or forty birds were singing at once a most beautiful medley filled the neighborhood.

Melospiza cinerea melodia. SONG SPARROW.— Tolerably common, occasionally singing.

Melospiza georgiana (?). SWAMP SPARROW (?).— One undoubtedly seen on February 24 in a patch of brown beard grass (*Andropogon scaparius* Michaux).

Passerella iliaca. FOX SPARROW.— First seen on February 24, and tolerably common thereafter.

Pipilo erythropthalmus. TOWHEE.— Male and female seen on February 24.

Cardinalis cardinalis. CARDINAL. Abundant, the males constantly singing. Their brilliancy of color and song made them a most striking feature of the leafless woods. A male and female were frequently seen consorting together. They may have been mated in these cases.

Ampelis cedrorum. CEDAR WAXWING.— Quite common in flocks. One specimen had its throat stuffed with mistletoe berries.

Lanius ludovicianus (subsp ?).— A Loggerhead Shrike was seen on February 24.

Dendroica coronata. MYRTLE WARBLER.— Abundant. The cane-brake at one point along the Ohio River was fairly alive with these birds. They were pursuing small winged insects.

Mimus polyglottos. MOCKINGBIRD.— Three or four individuals were seen each day, February 23–25.

Thryothorus ludovicianus. CAROLINA WREN.— Tolerably common. Its clear warbling whistle would suddenly break forth from some cover of underbrush or river-drift with amazing loudness.

Thryomanes bewicki. BEWICK'S WREN.— One specimen was collected in low, damp woodland.

Certhia familiaris americana. BROWN CREEPER.— Tolerably common.

Sitta carolinensis. WHITE-BREASTED NUTHATCH.— Seen on February 26 and 28.

Bæolophus bicolor. TUFTED TITMOUSE.— The most frequently seen and most characteristic bird at this time and place. Frequently calling.

Regulus satrapa. GOLDEN-CROWNED KINGLET.— Two seen on February 26.

Merula migratoria. AMERICAN ROBIN.— Common in flocks. Not heard singing.

Sialia sialis. BLUEBIRD.— One or two seen each day from February 22 to 28.

Through the courtesy of Prof. H. A. Gleason, instructor in Botany at the University of Illinois, I am able to give a list of the following trees and shrubs which grow in the vicinity of Cairo.

Ordinary Swamps.

Trees.

Acer rubrum,	*Salix amygdaloides,*	*Populus deltoides,*
" *saccharinum,*	" *nigra,*	*Quercus palustris,*
" *negundo,*	*Celtis mississippiensis*	*Liquidambar styraciflua,*
Gleditsia triacanthos,	*Platanus occidentalis,*	*Nyssa sylvatica,*
Hicoria pecan,	*Populus hetorophylla,*	*Fraxinus lanceolata.*

Shrubs.

Cephalanthus occidentalis,
Rosa carolina,
Adelia acuminata,
Rhamnus caroliniana,
Planera aquatica,
Salix interior,
Ilex decidua,
Benzoni benzoni.

Cypress Swamps.

All of the above and the following: Trees, *Taxodium distichium, Fraxinus profunda, Catalpa speciosa.* Shrubs: *Styrax americana, Itea virginica.*

Flood-plain forest, (trees and shrubs not found in above places).

Trees.

Quercus alba,
" *macrocarpa,*
" *platauridæ*
" *imbricaria,*
Celtis occidentalis,
Acer saccharum,
Fagus americana,
Tilia americana,
Juglans cinerea,
Hicoria orata,
Liriodendron tulipifera,
Ulmus americana,
Ulmus fulva,
Fraxinus quadrangulata,
Gymocladus dioica,
Betula linta,
" *nigra.*

Shrubs.

Carpinus caroliniana,
Ptelea trifoliata,
Malus coronaria,
Euonymus aleopurpureus,
Aralia spinosa,
Adelia acuminata,
Asimina triloba,
Xanthoxylum americanum,
Alnus nigrosa,
Arundinaria tecta,
Cercis canadensis,
Staphylea trifolia.

ON A COLLECTION OF BIRDS FROM WESTERN COSTA RICA.

BY OUTRAM BANGS.

IN 1891–1892 Mr. Geo. K. Cherrie made a famous collection of birds for the National Museum of Costa Rica, on the Rio Grande de Térraba in western Costa Rica, a region at that time practically unknown ornithologically. He subsequently published a long paper[1] on the results of his trip in which he described as new one species — *Henicorhina pittieri* — and recorded the occurrence for the first time in Costa Rica of ten more,— *Basileuterus veraguensis, Hylophilus viridiflavus, Saltator albicollis, Capsiempis flaveola, Synallaxis albescens, Automolus pallidigularis, Gymnocichla nudiceps, Dendrobates ceciliæ, Melanerpes chrysauchen* and *Centurus tricolor.*

Mr. C. F. Underwood, whose name is so familiar to naturalists the world over interested in the biota of Central America, had always felt that much yet remained to be done in Cherrie's Boruca region, and for a long time had urged me to let him make a trip there in the spring and summer — Cherrie's work having been done in the autumn and winter. Through the generous interest of John E. Thayer, Esq., this was finally arranged, and Underwood started from San José in March, 1906. He stopped for a short time, both going and coming, at Punta Arenas and Boca Barranca in the Golfo de Nicoya, where he collected a few birds, but the main part of his time was spent on Cherrie's old ground on the Rio Grande de Térraba, where he worked from April to August. The principal localities at which he collected here, are Pozo del Rio Grande, 500 feet altitude to sea level; Lagato, 800 feet altitude; Barranca, Paso Real and Terraba, all about 1,000 feet altitude; and Boruca, about 1545 feet altitude.

His collection, numbering nearly 6,000 skins, is a very fine one, and in the following pages I describe from it as new — *Micrastur*

[1] Exploraciones Zoológicas | efectuadas | en la parte meridional de Costa Rica | por los años de 1891–92 | I | Aves | par | Geo. K. Cherrie | Taxidermista del Museo nacional, | 1893, | San José de Costa Rica.| Tip. Nacional.

interstes, Gymnocichla nudiceps erratilis, Synallaxis albescens latitabunda, Dendrocolaptes sancti-thomæ hesperius, Leptopogon pileatus faustus, Cyanerpes lucidus isthmicus, and *Buarremon costaricensis.* One overlooked, but well marked subspecies, *Glaucis hirsuta æneus* (Lawrence) is reinstated, and twelve birds are recorded, for the first time, I believe, from Costa Rica — *Asturina nitida, Cataptrophorus semipalmata, Ereunetes occidentalis, Chæmepella minuta, Elainea chiriquensis, Myiarchus lawrencei bangsi, Catharus griseiceps, Troglodytes musculus inquietus, Eucometis spodocephala stictothorax, Emberizoides sphenura hypochondriacus, Sporophila gutturalis,* and *Saltator magnoides intermedius.*

Original conditions still prevail in western Costa Rica, and there are enormous stretches of virgin forest and perfectly wild country, and the lowland forest birds are safe for a time at least. I have, however, grave fears that many of the very rare and still but little known species of the Atlantic lowland forest are doomed. The banana industry is sweeping away the forest at a terrible rate, and in the few years since the United Fruit Company established itself at Port Limon the forest has been entirely cleared away not only directly about that place, but way south into the famous Talamanca District. Very few of the forest birds take kindly to banana plantations, and as the forest goes they go with it.

The great difference between the lowland forest ornis of the Atlantic and Pacific sides of the main cordillera in Costa Rica is too well known to need special comment here, but the sliding past each other of northern and southern forms is very remarkable — instance after instance could be given of a bird whose Central American form extends down the Atlantic lowlands, and whose Panaman form pushes north up the Pacific slope, often passing each other, the mountains, however, between their respective ranges preventing them from intergrading or even meeting. It is largely to this cause that Costa Rica owes its very extensive bird fauna, numbering well over 700 species and subspecies, and that in a country scarcely bigger than the state of Florida.

In connection with the making and identifying of the present collection, I beg to express my sincerest thanks to many of my friends — in the first place to John E. Thayer, Esq., who generously furnished the necessary funds for Underwood's expedition, and

then to Dr. Robert Ridgway, Mr. E. W. Nelson and Mr. J. H. Riley, who made many comparisons for me with material in Washington.

A complete catalogue of Underwood's collection made in western Costa Rica in the spring and summer of 1906, in which colors, when definite names are given them, are according to Ridgway's 'Nomenclature,' and all measurements are in millimetres, is as follows:

ARDEIDÆ.

Butorides virescens maculata (*Bodd.*). Two males, one fully adult the other youngish, Pozo del Rio Grande, April.

These skins agree with others from Panama, etc., and in my opinion are identical with the bird of the West Indies.

ANATIDÆ.

Querquedula discors (*Linn.*). Four adults, one male, three females, Pozo del Rio Grande, April.

FALCONIDÆ.

Micrastur interstes sp. nov.

One young male Pozo del Rio Grande, Aug. 4.

Type, from La Estrella, Cartago, Costa Rica, adult ♂, No. 16414, coll. of E. A. & O. Bangs, collected Mar. 28, 1903 by C. F. Underwood.

Characters. Similar to *Micrastur guerilla* Cassin of Mexico, Guatemala, Honduras etc. but slightly larger, the adult male with the underparts darker — the dusky bars broader and the pale interspaces narrower and grayer, less purely white, in color; the whole belly, thighs and under tail coverts heavily barred with dusky, whereas in *M. guerilla* the middle of the belly is white (unbarred or nearly so) and the thighs and under tail coverts are narrowly barred, the dusky bars far apart; white bands on tail wider, more conspicuous and more complete. The adult female differs from that of *M. guerilla* as does the male, but the differences are not so marked as in the other sex. Young birds of the new form are much more heavily barred below than young of *M. guerilla*, and the barring includes the belly, which is plain in *M. guerilla*, and the ground color is darker and more ochraceous.

Measurements.

No.	Sex.	Wing.	Tail.	Tarsus.	Culmen.
16414 Type,	♂ ad.	170	157	56	18
16413 Topotype,	♀ ad.	179	161	58.5	21

Remarks. There is no doubt that the small species of *Micrastur* with barred underparts very much need careful reviewing; the reviews of Ridgway and of Gurney being based on much too scanty material. Still, after going over the whole matter very carefully, I cannot find that the bird of Costa Rica and Panama has ever been named, and as it certainly is different from *M. guerilla* of Mexico and northern Central America on the one hand and from *M. zonothorax* (Cab.) of Colombia and Venezuela on the other, I venture to give it a name. Formerly[1] I had referred a bird from Divala, Chiriqui to *M. zonothorax*, but this specimen belongs to the new form here described from Costa Rica.

Geranospizias niger (*Du Bus*). One adult male, Pozo del Rio Grande, April 6.

Accipiter bicolor schistochlamys *Hellmayr.* Two males, one adult, one young, Boruca and Pozo del Rio Grande, May and August.

Asturina nitida (*Lath.*). One fine adult male, Pozo del Rio Grande, April 3.

This hawk has not previously been taken, I believe, so far north as Costa Rica.

Rupornis ruficauda (*Scl. & Salv.*). Three adults, both sexes, Boruca and Pozo del Rio Grande, April and May.

Elanoides furcatus (*Linn.*). Two adults, male and female, Boruca, April 25.

Leptodon cayennensis (*Gmel.*). One adult male, Pozo del Rio Grande, Aug. 4.

Cerchneis sparveria (*Linn.*). One female, Boruca, May 6.

I cannot attempt to say to what subspecies this specimen is referable, as it is in exceedingly abraded plumage.

Pandion haliaëtus carolinensis (*Gmel.*). One male, Barranca Puntarenas, Aug. 12.

TINAMIDÆ.

Tinamus castaneiceps *Salvadori.* Seven specimens, adults of both sexes and one youngish male, April and August. The young example, which is moulting, has the back and wings irregularly marked with small yellowish spots.

Crypturus soui modestus (*Cab.*). Twelve specimens, adults of both sexes and two chicks, one taken April 19, the other May 24. The larger of these, though no bigger than a sparrow, has the wing feathers all well grown and undoubtedly flew well. Boruca and Pozo del Rio Grande, April, May and August.

CRACIDÆ.

Crax panamensis *Ogilvie Grant.* Two adult males, Pozo del Rio Grande, April 8.

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[1] Auk, Vol. XVIII, October, 1901, p. 358.

Penelope cristata (*Linn.*). Six adults, both sexes, Pozo del Rio Grande, April and August.

Ortalis cinereiceps *Gray*. One adult male, Boruca, April 25.

ODONTOPHORIDÆ.

Odontophorus castigatus *Bangs*. Seven specimens, adults of both sexes, and one nearly grown young, Boruca and Pozo del Rio Grande, April and May.

RALLIDÆ.

Aramides cajanea (*Müll.*). One adult female, Boruca, May 13.

CHARADRIIDÆ.

Ægialeus semipalmatus (*Bonap.*). One adult male, Puntarenas, Aug. 20.

Ægialitis collaris (*Vieill.*). Eight specimens, adults and youngish, both sexes, Pozo del Rio Grande and Barranca Puntarenas, April and August.

Catoptrophorus semipalmatus (*Gmel.*). One specimen, in partly barred plumage, Puntarenas, Aug. 13.

I believe this is the first actual record for the Willet in Costa Rica.

Tringoides macularius (*Linn.*). Seven specimens, both sexes, all in spotted plumage but one, Barranca Puntarenas and Pozo del Rio Grande, April and August.

Ereunetes occidentalis *Lawr.* Six specimens, both sexes, Barranca Puntarenas, August.

Rather to my astonishment the Western Sandpiper does not appear to have been taken in Costa Rica previously to Mr. Underwood's getting this series.

Limonites minutilla (*Vieill.*). Four specimens, both sexes, Barranca Puntarenas, and Pozo del Rio Grande, April and August.

PARRIDÆ.

Asarcia variabilis (*Linn.*). One adult male, Barranca Puntarenas, Aug. 14.

COLUMBIDÆ.

Columba speciosa *Gmel.* Eighteen specimens, adults and young of both sexes, Boruca and Paso Real, April–July.

Young birds, not full grown, lack the scaly markings of the adult plumage, being nearly uniform rusty brown above, with the underparts paler, grayer and whitish on midde of belly.

Columba rufina *Temm. & Knip.* Five adults, both sexes, Paso Real, Pozo del Rio Grande and Barranca Puntarenas, July and August.

Columba nigrirostris *Scl.* Four adults, both sexes, Boruca, Paso Real and Pozo del Rio Grande, May, July and August.

Chæmepella minuta (*Linn.*). Forty specimens, adults and young of both sexes, Paso Real, July.

Although recorded from southern Mexico and Guatemala, and again from Panama, this little dove has, so far as I know, not before been taken in Costa Rica.

Chæmepella rufipennis rufipennis (*Bonap.*). Twenty-three specimens, both sexes, young and adult, Boruca, Pozo del Rio Grande and Barranca, April–July.

Claravis pretiosa pretiosa *Ferrari-Perez.* Twenty-five specimens, both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Leptotila verreauxi *Bonap.* Twenty-one specimens, adults and young, both sexes, Boruca, Paso Real, Pozo del Rio Grande and Barranca Puntarenas, April–August.

Leptotila rufinucha *Scl.* & *Salv.* Thirty-three specimens, adults and young of both sexes, Boruca and Pozo del Rio Grande, April, May and August.

Geotrygon montana (*Linn.*). Nineteen adults, both sexes, Boruca and Pozo del Rio Grande, April–June.

After very careful comparison of a large amount of material I can find no constant differences between birds of this species from the Greater Antilles and from the continent. Mainland specimens perhaps average a little darker in color, although many are indistinguishable from island skins in this respect: they also average just a trifle smaller, but not enough so to be appreciable in comparing single individuals.

PSITTACIDÆ.

Ara macao (*Linn.*). One adult female, Pozo del Rio Grande, April 20.

Brotogerys jugularis (*Müll.*). Thirteen specimens, both sexes, Paso Real, Pozo del Rio Grande and Barranca Puntarenas, July, April, and August.

Pionus senilis (*Spix*). Three specimens, both sexes, Paso Real, July.

CUCULIDÆ.

Coccyzus minor minor (*Gmel.*). One adult female, Pozo del Rio Grande, April 14.

Piaya cayana thermophila (*Scl.*). One adult male, Boruca, May 7.

Dromococcyx phasianellus (*Spix*). One female, Boruca, June 25.

PICIDÆ.

Melanerpes chrysauchen *Salv.* Twenty-two specimens, both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Melanerpes wagleri *Salv.* & *Godm.* Twenty-two specimens, both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Venilornis neglectus *Bangs.* Three adults, two males and a female, Pozo del Rio Grande, April.

Cherrie has already recorded one specimen of this species from Boruca under the name *Dendrobates ceciliæ* (Malh.); the bird was rare in the region visited by Underwood who saw but the three examples he took.

Campophilus guatemalensis buxans *Bangs.* Four specimens, both sexes, Boruca, Pozo del Rio Grande and Barranca Puntarenas, April, June and August.

Ceophlœus lineatus (*Linn.*). Five specimens, both sexes, Boruca, Paso Real and Pozo del Rio Grande, April, May and July.

Hargitt in 'Catalogue of Birds in the British Museum,' mentions that Costa Rican examples of this species examined by him differed slightly from typical specimens in being less distinctly barred below. Four of the five skins in the present series are very rusty below, possibly stained, and the black bars are rather indistinct, but the fifth does not differ in this respect from South American examples. All are rather smaller than typical examples; in point of size corresponding more nearly with *C. scapularis*, and suggesting that possibly the two forms actually intergrade in western Costa Rica.

Ceophlœus scapularis (*Vig.*). One adult female, Barranca Puntarenas, August.

This brings the ranges of the two forms very near to one another, and the Barranca specimen may be an intergrade; its bill is white but otherwise it does not differ from the Rio Grande examples of *C. lineatus*, being of the same size and having an equally black back.

Picumnus olivaceus flavotinctus *Ridgw.* Sixteen specimens, both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

RHAMPHASTIDÆ.

Rhamphastos tocard *Vieill.* Seventeen specimens, adults of both sexes and one young female, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Pteroglossus frantzii *Cab.* Three adults, both sexes, Boruca and Pozo del Rio Grande, April and May.

GALBULIDÆ.

Galbula melanogenia *Scl.* Thirty-six specimens, adults and young of both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Young individuals, about two thirds grown, with very short bills, are like the adults in color, and show the same sexual difference in the color of the throat, except that their upper parts are more coppery, less green.

BUCCONIDÆ.

Bucco dysoni *Scl.* Two adults, male and female, Paso Real, July 8.

Ma acoptila panamensis panamensis *Lafr.* Twenty-one specimens, young and adult of both sexes, Boruca, Paso Real, Pozo del Rio Grande and Lagato, April–August.

This species is dichromatic, there being a distinctly gray and a distinctly red-brown phase of plumage, having nothing to do with sex, age or season. In large series, as with most dichromatic birds, some skins intermediate between the two phases will always be found. I cannot see any differences between western Costa Rican skins and those from Panama, and if the subspecies *costaricensis* is a valid form these Rio Grande specimens do not represent it. One skin in my collection from Carrillo, the only one I have from eastern Costa Rica, appears to be quite typical *M. inornata* Du Bus, and I hardly think there is room for a subspecies *costaricensis*.

TROGONIDÆ.

Trogon atricollis tenellus (*Cab.*). Twenty-five specimens, adults and young of both sexes and one nestling male with wholly tawny back and breast and the belly slightly paler and somewhat mixed with whitish, Boruca and Pozo del Rio Grande, April–June.

Trogon bairdi *Lawr.* Nineteen specimens, both sexes, Boruca and Pozo del Rio Grande, April and May.

Trogon melanocephalus *Gould.* Six specimens, both sexes, Barranca Puntarenas, August.

Trogon caligatus caligatus *Gould.* Seventeen specimens, both sexes, Boruca, Barranca and Barranca Puntarenas, May, June and August.

Trogon massena *Gould.* Four adult males, Boruca and Pozo del Rio Grande, April, May and August.

MOMOTIDÆ.

Eumomota superciliaris australis *Bangs.* Four adults, both sexes, Barranca Puntarenas, August and January, 1905. Three of the four specimens were taken during a few days spent by Underwood at this place, in January, 1905, and are included here with the other collection. All are like the two original skins from Bebedero upon which I based the subspecies.

Momotus lessoni *Less.* Five specimens, adults of both sexes, and two young in nestling plumage, which is similar to the adult plumage except in lacking the bunch of black feathers on the chest, Boruca, Pozo del Rio Grande and Barranca Puntarenas, April, May and August.

ALCEDINIDÆ.

Ceryle torquata torquata (*Linn.*). Four adults, both sexes, Paso Real, Pozo del Rio Grande and Barranca Puntarenas, April, July and August.

Ceryle amazona (*Lath.*). One adult male, Pozo del Rio Grande, April.

Ceryle americana septentrionalis *Sharpe.* Nine specimens, both sexes, Boruca, Lagato and Pozo del Rio Grande, April–August.

ASIONIDÆ.

Pulsatrix perspicillata (*Lath.*). Two specimens, male and female, Pozo del Rio Grande, April.

CAPRIMULGIDÆ.

Nyctidromus albicollis (*Gmel.*). Three specimens, an adult male and two young in nestling plumage, Boruca, May and July.

MICROPODIDÆ.

Streptoprocne[1] **zonaris zonaris** (*Shaw*). Six adults, both sexes, Boruca, April and May.

TROCHILIDÆ.

Threnetes ruckeri (*Bourc.*). Fifteen specimens, adults of both sexes, and one not full grown young, Pozo del Rio Grande, April and August.

Glaucis hirsuta æneus (*Lawr.*). Three adults, two males and a female, Pozo del Rio Grande, August.

The form of *Glaucis hirsuta* that ranges from Costa Rica to Nicaragua, and that was named *Glaucis æneus* by Lawrence (Proc. Ac. Phil. 1867, p. 232), is a strongly marked subspecies, differing from true *G. hirsuta* of Panama and southward, in its smaller size, nearly wholly black bill, more bronzy back and much clearer and brighter cinnamomeous color of the underparts — all southern specimens being conspicuously dull and grayish cinnamon beneath.

Phaëthornis longirostris longirostris (*Less. & Delatt.*). Sixteen specimens, adults of both sexes, Pozo del Rio Grande and Boruca, April, June and August.

Phaëthornis guy coruscus *Bangs.* Two specimens, male and female, Pozo del Rio Grande, August.

Phaëthornis adolphi *Gould.* Fourteen adults, both sexes, Boruca, April–July.

Florisuga mellivora (*Linn.*). One adult male, Boruca, June 21.

Aphantochroa cuvieri (*Delal. & Bourc.*). Five adults, both sexes, Boruca, May and June.

Agyrtria decora (*Salv.*). Eighty-nine specimens, both sexes, Boruca, Paso Real, and Pozo del Rio Grande, April–August.

Saucerottea sophiæ (*Bourc. & Muls*). Four adults, both sexes, Barranca Puntarenas, August.

Saucerottea niveoventer (*Gould*). One hundred and three specimens, both sexes, Boruca, May–July.

Amizilis tzacatl dubusi (*Bourc. & Muls.*). Fifty-one specimens, both sexes, Boruca, Barranca, and Boca Barranca Puntarenas, April–August.

Amizilis cinnamomea cinnamomea (*Less.*). One adult female, Barranca Puntarenas, August.

Hylocharis eliciæ (*Bourc. & Muls.*). One hundred and forty-one specimens, both sexes, Boruca, and Pozo del Rio Grande, May–August.

Chlorostilbon assimilis *Lawr.* Fourteen specimens, adults of both sexes, Boruca, May and June.

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[1] See Oberholser, Proc. Biol. Soc. of Washington, Vol. XIX, pp. 67–70. May, 1906, for change of generic name of these swifts.

Thalurania colombica venusta (*Gould*). Forty-four adults, both sexes, Boruca, Barranca and Pozo del Rio Grande, May–August.

Elvira chionura (*Gould*). One adult female, Boruca, June 30.

This appears to be a rare bird in Costa Rica; though it has been before recorded from the Republic, I can find no exact localities; like other Panaman forms that extend into Costa Rica it probably reaches only to the Pacific slope.

Colibri delphinæ (*Less.*). One adult male, Boruca, May 21.

Heliothrix barroti (*Bourc. & Muls.*). One adult female, Paso Real, July 16.

Floricola superba (*Shaw*). Fifty specimens, both sexes, many young, Boruca, Paso Real, and Barranca, April–July.

On the whole Costa Rican skins of *Floricola superba* are nearer to true *superba* than to *pallidiceps*, though some are intermediate, between the two forms. The Costa Rican bird was named *sclateri* by Cab. & Heine, but nothing is gained by using this name for a purely intermediate race.

Clais guimeti (*Bourc. & Muls.*). Fourteen specimens, both sexes, Boruca, May and June.

Lophornis adorabilis *Salv.* Twelve specimens, both sexes, Boruca, May and June.

FORMICARIIDÆ.

Thamnophilus transandeanus *Scl.* Twenty-five specimens, adults of both sexes and two young males, Boruca, Pozo del Rio Grande, Lagato and Barranca Puntarenas, April–August.

Thamnophilus bridgesi *Scl.* One hundred and fifty-one specimens, adults and young of both sexes (the female being of course the so-called *Thamnophilus bridgesi* Scl. and the male the *T. punctatus* Cab.; as *bridgesi*, though based upon the female, is the older name it must stand for the species). Boruca, Paso Real, Pozo del Rio Grande and Lagato, April–August.

Thamnophilus doliatus (*Linn.*). Thirty specimens, both sexes, Boruca, Paso Real, Lagato and Barranca Puntarenas, April–August.

Myrmotherula ménétriesi (*d'Orb.*). Seventeen specimens, adults and young of both sexes, Boruca and Pozo del Rio Grande, April–July.

Formicivora boucardi *Scl.* Forty-four specimens, both sexes, Boruca, Paso Real, Pozo del Rio Grande, and Lagato, April–August.

Rhamphocænus rufiventris (*Bonap.*). Seventeen specimens, both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Cercomacra tyrannina crepera (*Bangs*). One hundred and sixteen specimens, young and adult of both sexes, Boruca, Paso Real, Pozo del Rio Grande and Barranca, April–August.

Gymnopithys bicolor olivascens (*Ridgw.*). Nineteen specimens, both sexes, Boruca and Pozo del Rio Grande, April–June.

Myrmelastes exsul occidentalis (*Cherrie*). Seventy-four specimens, both sexes, young and adult, Boruca, Paso Real, Pozo del Rio Grande and Barranca, April–August.

Gymnocichla nudiceps erratilis subsp. nov.

Ninety-two specimens, both sexes, young and adults, Boruca, Paso Real, Pozo del Rio Grande and Barranca, April–August.

Cotypes, from Boruca, Costa Rica, adult ♀, No. 18990, and adult ♂, No. 18991, coll. of E. A. and O. Bangs. Collected June 11, 1906, and May 22, 1906, respectively by C. F. Underwood.

Characters. Similar to true *G. nudiceps* of northern Colombia and Panama, but larger, wing and tail longer (in the adult ♂ of the new form averaging, wing, 78.5; tail, 62; in true *G. nudiceps* averaging wing, 76; tail, 58), bill and tarsus of about the same length in both forms. The adult male not different in color, from the adult ♂ of true *G. nudiceps;* the adult female, however, much more intensely ferruginous, the upper parts deeper and redder and without the olivaceous tinge seen in true *G. nudiceps;* the whole underparts deep, strong ferruginous, scarcely if any paler on belly, quite different in color from the orange-rufous underparts of true *G. nudiceps* which are also duller and paler in middle of belly; tail and wing, especially the edgings of lesser and middle coverts, much deeper ferruginous.

Measurements.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
18991	♂ ad.	Boruca, C. R.	80	62	28	22
18992	♂ ad.	"	78	65	28.5	19
18993	♂ ad.	"	80	63	29	21.5
18994	♂ ad.	"	79	64	29	22
18995	♂ ad.	"	78	61	29	22
18996	♂ ad.	"	77.5	62	27.5	21.5
18997	♂ ad.	"	78.5	64	27	22
18998	♂ ad.	"	77	59	29	22
18999	♂ ad.	"	77	60	28.5	21
19000	♂ ad.	Pozo del Rio Grande, C. R.	79.5	61	28	22
18990	♀ ad.	Boruca, C. R.	75	58.5	28	21.5
19001	♀ ad.	"	74	57	26.5	20.5
19002	♀ ad.	"	75	58	27	19.5
19003	♀ ad.	"	75	58.5	28	21
19004	♀ ad.	"	76	58	28	21.5
19005	♀ ad.	"	74.5	59	27.5	21
19006	♀ ad.	"	73	56	26.5	22
19007	♀ ad.	"	76	56	28	21
19008	♀ ad.	"	75.5	55	27.5	21.5
19010	♀ ad.	Pozo del Rio Grande, C. R.	74.5	56.5	28	21

Remarks. Cherrie in the paper referred to in the introduction of this article recorded for the first time, I believe, the occurrence of *Gymnocichla nudiceps* in western Costa Rica. Underwood found the bird to be common

in the Rio Grande region and secured the large series listed above. I was much surprised, however, on comparing these skins with a series from Loma del Leon, Panama, taken some years ago by Brown, to find the Costa Rican form so different. The female of the Costa Rican bird can be told at a glance by its much deeper and more intensely ferruginous general coloration; the male, as might be expected in an almost wholly black bird, is not different in color, but can be distinguished by having a longer wing than true *G. nudiceps*, this difference being probably greater than the measurements indicate, because the Boruca series is in rather worn *summer* plumage, whereas the Panaman specimens, with which I compare them, are in fresh, unworn spring plumage.

Formicarius hoffmanni hoffmanni (*Cab.*). Eighty specimens, adults of both sexes, and one young female, Boruca, Paso Real, Pozo del Rio Grande, Lagato and Barranca, April–August.

A young female, in nestling plumage and not full grown, is similar to the adults in color, except in being duller with all the colors more blended, the chestnut patches on sides of neck and crissum less strongly marked, and the tail blackish only at tip.

One specimen has the whole throat white, marked with small black dots. I had already another skin just like it from Chiriqui, and Ridgway described a specimen, supposed to be a young male, of *F. nigrifrons* (Proc. U. S. Nat. Mus., Vol. XVI, p. 672, 1893) in similar plumage.

That these black spotted, white-throated birds do not represent the normal young plumage is proved by the presence in this series of the young female described above which has the throat just as in the adults. Moreover, my two specimens do not appear to be young — that is not nestlings — being so far as one can judge by the prepared skin, full grown and mature, and it remains to be found out just what stage of plumage these white-throated individuals, recorded now in two species of *Formicarius*, represent.

Grallaria lizanoi *Cherrie.* Twenty-four specimens, both sexes, Boruca, Paso Real, and Pozo del Rio Grande, April–August.

DENDROCOLAPTIDÆ.

Synallaxis albescens latitabunda subsp. nov.

Five specimens, both sexes, three adults and two young, Boruca, Paso Real and Barranca, May–July.

Type, from Boruca, Costa Rica, No. 19064, ♂ adult, coll. of E. A. and O. Bangs. Collected May 31, 1906, by C. F. Underwood.

Characters. Similar to *Synallaxis albescens albigularis* Sel. of northeastern South America, but differing in having red of crown much more extended, reaching backward over entire occiput; the white throat more sharply defined, and gray band across chest more pronounced; the red-brown of wings and crown rather less ochraceous, more bricky.

Measurements.

No.	Sex.	Locality.	Wing.	Tail.	Culmen.
19064	♂ ad.	Boruca, Costa Rica	51	69.5	11.5
19062	♂ ad.	Paso Real, Costa Rica	53.5	69.5	11.5
19061	♀ ad.	Paso Real, Costa Rica	48	62.5	11

Remarks. Hellmayr has lately (Nov. Zool., XIII, p. 28, 1906) pointed out the differences between true *S. albescens* of southern South America and *S. albescens albigularis* and assigns to the latter form all specimens from eastern Ecuador, Colombia, Venezuela and the Orinoco region. Specimens from western Costa Rica, the extreme northern limit of the species, differ quite a little from those in my collection from Colombia, and must be considered, I think, to represent still another subspecies.

Synallaxis pudica *Scl.* Twenty specimens, adults of both sexes and one young female, Boruca and Pozo del Rio Grande, April–August.

The young differs from the adults in lacking the rufous crown, the whole upper parts being brownish olive, and the underparts dull olive instead of gray.

Automolus virgatus (*Lawr.*). Four adults, both sexes, Pozo del Rio Grande, April and August. This is of course the bird recorded by Cherrie as *A. pallidigularis.*

Automolus exsertus *Bangs.* Fifty-three specimens, both sexes, Boruca Lagato and Pozo del Rio Grande, April–August.

Xenops genibarbis mexicanus *Scl.* Forty-nine specimens, both sexes, Boruca, Paso Real, Pozo del Rio Grande and Lagato, April–August.

Sclerurus guatemalensis (*Hartl.*). Four adults, both sexes, Boruca, Paso Real and Pozo del Rio Grande, April, May and July.

Glyphorhynchus cuneatus (*Licht.*). One adult female, Pozo del Rio Grande, April 11.

Dendrocichla anabatina anabatina *Scl.* Fourteen specimens, both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Dendrornis nana costaricensis *Ridgw.* Fifty-three specimens, both sexes, young and adult, Boruca, Paso Real, Pozo del Rio Grande, Barranca, Lagato, and Barranca Puntarenas, April–August.

Dendrornis lachrymosa eximia *Hellmayr.* One adult male, Pozo del Rio Grande, April 12.

Picolaptes compressus compressus (*Cab.*). Fourteen specimens, both sexes, Boruca, Paso Real, Pozo del Rio Grande, Barranca and Barranca Puntarenas, April–July.

Dendrocolaptes sancti-thomæ hesperius subsp. nov.

Fourteen specimens, both sexes, Boruca, Paso Real, Pozo del Rio Grande and Lagato, April–August.

Type, from Lagato, Costa Rica, adult ♂, No. 19119, coll. of E. A. and O. Bangs. Collected May 27, 1906, by C. F. Underwood.

Characters. Similar to true *D. sancti-thomæ* (Lafr.), and of about the same size, but differing in color and markings as follows: head duller, more rusty, less yellowish or ochraceous; back less heavily marked with blackish cross bars; ground color of under parts slightly darker, more tawny, less ochraceous; the black bars on the feathers of under parts much narrower and more blended with the general color of the feathers, producing the effect of a fine and rather indistinct dusky cross-barring below. In true *D. sancti-thomæ*, the bars on the under surface are wide, black, and stand out in bold relief against the paler, yellower, ground color.

Measurements, adult ♂, *type:* Wing, 124; tail, 116; tarsus, 26.5; culmen, 40.5. Adult ♀, No. 19142, Boruca, Costa Rica, wing, 118; tail, 106; tarsus, 26.5; culmen, 39.

Remarks. This form — a fairly well marked subspecies of *D. sancti-thomæ* — appears to be confined to western Costa Rica. Specimens from eastern Costa Rica,— Juan Vinas and Cariblanco de Sarapiqui — being extreme examples of true *D. sancti-thomæ*, to which I also refer skins from Divala, Chiriqui, though these are not so extreme.

In all probability Lafresnaye's type of *Dendrocops sancti-thomæ* came from the town of Santo Tomas, near Orma, Honduras. It had been supposed by some ornithologists that Lafresnaye bestowed this name on his bird thinking it came from the island of St. Thomas in the West Indies (see Salvin and Godman, Biol. Cent.-Am., Vol. II, p. 192). Skins from Honduras are similar in all respects to those from eastern Costa Rica.

TYRANNIDÆ.

Placostomus superciliaris (*Lawr.*). Nineteen specimens, both sexes, Boruca, Pozo del Rio Grande and Paso Real, April–August.

Rhynchocyclus brevirostris (*Cab.*). Six adults, both sexes, Boruca and Poso del Rio Grande, April–June.

Rhynchocyclus cinereiceps (*Scl.*). Eighteen specimens, adults of both sexes and one young male, Boruca, Paso Real and Pozo del Rio Grande, April–July.

Todirostrum cinereum finitimum *Bangs.* Two specimens, male and female, Pozo del Rio Grande, August.

Todirostrum schistaceiceps *Scl.* Thirty-two specimens, adults and young of both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Oncostoma cinereigulare (*Scl.*). Thirteen specimens, both sexes, Boruca and Pozo del Rio Grande, April–August.

Pipromorpha assimilis dyscola (*Bangs*). Seventy-one specimens, adults and young of both sexes, Boruca, Paso Real, Pozo del Rio Grande, and Barranca, April–August.

Leptopogon pileatus faustus subsp. nov.

Five adults, both sexes, Boruca and Paso Real, May and July.

Type, from Boruca, Costa Rica, adult ♂, No. 17828, coll. of E. A. & O. Bangs. Collected May 5, 1906, by C. F. Underwood.

Characters. Similar to true *Leptopogon pileatus* Cabanis of Guatemala and southern Mexico, and of about the same size, but back paler green; under parts much paler, especially the belly which is primrose yellow; lining of wing and wing bands paler and much yellower, less fulvous; margins of rectrices and upper tail-coverts much greener, less reddish olive.

The new form is much nearer to *C. superciliaris* than true *C. pileatus* in general coloration, except for the brown instead of gray cap.

Measurements.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
17828	♂ ad.	Boruca, C. R.	67	56.5	15	12.5
17830	♂ ad.	Paso Real, C. R.	64	51	14.5	12.5
17832	♂ ad.	"	65	56	14	13
17831	♀ ad.	"	59	45	14	13
17829	♀ ad.	Boruca, C. R.	59	48	13.5	13

Remarks. *C. pileatus faustus* is a well marked southern form of which the five skins before me vary but little in color among themselves, all differing from northern specimens in their paler colors and light yellow bellies.

The type locality of the species is Guatemala; one skin in my collection from that country (Gualan, Guatemala) agrees much better with examples from Vera Cruz, Mexico, than with the Costa Rican series. It, however, approaches slightly the southern form in some respects, and I judge the extreme characters of the northern form are only attained in the very northern part of its range — southern Mexico.

Myiopagis placens accola *Bangs.* Three adults, one male, two females, Boruca, April, May and June.

Camptostoma pusilla flaviventre (*Scl.* & *Salv.*). Two adults, male and female, Paso Real and Pozo del Rio Grande, July and August.

Tyranniscus parvus *Lawr.* Forty-three specimens, young and adults of both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Elainea flavogastra subpagana (*Scl.* & *Salv.*). Twenty-six specimens, adults and young of both sexes, Boruca, Paso Real and Lagato, April–July.

Elainea chiriquensis *Lawr.* Twelve specimens, adults and young of both sexes, Boruca, Paso Real and Lagato, April–July.

This appears to be the first time this species has been recorded from Costa Rica, though the type came from near by in Chiriqui.

Mr. Ridgway has kindly informed me that the species must be known by Lawrence's name though both Sclater and Allen synonymize *E. chiriquensis* with *E. flavogastra subpagana*; they however, were clearly wrong.

Lawrence's type, in the U. S. National Museum, agrees entirely with the present Costa Rican series and also with Panama birds, upon which I based my *Elainea sordidata* (the type of the latter was from the Pearl

Islands, but specimens from Panama, Chiriqui and Costa Rica prove to be the same).

Elainea chiriquensis Lawrence is an earlier name for the species than *Elainea albivertex* Pelz.; whether or not the latter can be maintained as a southern subspecies I am not now prepared to say.

Legatus albicollis (*Vieill.*). Four specimens, three males and a female, Boruca, April–June.

Myiozetetes similis superciliosus (*Bonap.*). Two specimens, male and female, Boruca, June and July.

Pitangus derbianus derbianus (*Kaup*). One adult female, Puntarenas, Aug. 25.

Myiodynastes luteiventer *Bonap.* One adult female, Puntarenas, August.

Myiodynastes audax nobilis (*Scl.*). One adult male, Boruca, May 15.

Onychorhynchus mexicanus fraterculus *Bangs.* Eleven specimens, adults of both sexes and one young female, Boruca, Paso Real and Pozo del Rio Grande, April, May and July.

The young female, about half grown, taken April 29, is similar in color to the adults except that the throat and breast are thickly marked with small black spots and the back mottled with dusky and yellowish.

Myiobius barbatus atricauda *Lawr.* Seventeen adults, both sexes, Boruca and Pozo del Rio Grande, April–August.

Myiobius xanthopygus sulphureipygius (*Scl.*). Thirty-two specimens, adults of both sexes and young, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Terenotriccus fulvigularis (*Salv. & Godm.*). Thirteen specimens, both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Empidonax traillii traillii (*Aud.*). Two males, Boruca, April 28, and Pozo del Rio Grande, Aug. 15.

Empidonax traillii alnorum *Brewster.* Three females, Boruca, April 27, May 8 and May 15.

Empidonax flaviventris (*Baird*). Seven specimens, both sexes, Boruca and Pozo del Rio Grande, April 9–May 9.

Horizopus richardsonii sordidulus (*Scl.*). Five adults, both sexes, Boruca, May.

Myiarchus nuttingi nuttingi *Ridgw.* One adult male, Barranca Puntarenas, Aug. 15.

Myiarchus lawrencei bangsi *Nelson.* Nine adults, both sexes, Boruca, Pozo del Rio Grande and Lagato, April, May, June and August.

Although these skins vary somewhat among themselves in the amount of rufous edging to the tail and wing feathers, all are distinctly referable to *M. lawrencei bangsi* differing from *M. lawrencei nigricapillus* in their intensely black heads, greener backs and smaller bills.

Tyrannus tyrannus tyrannus (*Linn.*). One adult male, Pozo del Rio Grande, April 11.

Tyrannus melancholicus satrapa (*Licht.*). Two adult males, Boruca, April 30, and July 9.

Muscivora tyrannus (*Linn.*). One male, Paso Real, July 22.

PIPRIDÆ.

Pipra mentalis ignifera *Bangs.* Fifty-four specimens, adults of both sexes and young, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Pipra vetulina *Berlepsch.* Forty-five specimens, both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Coropipo leucorrhoa altera *Hellmayr.* Eleven specimens, both sexes, Boruca and Paso Real, April–July.

Chiroxiphia linearis (*Bonap.*). Two specimens, male and female, Paso Real and Barranca Puntarenas, July and August.

Manacus aurantiacus *Salvin.* One hundred and seven specimens, adults of both sexes and young, Boruca, Pozo del Rio Grande, Paso Real and Lagato, April–August.

Scotothorus veræpacis dumicola *Bangs.* Three specimens, both sexes, Pozo del Rio Grande, April.

COTINGIDÆ.

Tityra semifasciata costaricensis *Ridgway.* Nine adults, both sexes, Boruca, and Barranca Puntarenas, April, May, June and August.

Tityra albitorques fraserii (*Kaup*). Five specimens, adult male and female and three young, Paso Real, July 20–22. The young are in nestling plumage and have the back and wings much suffused with yellowish brown, the whole side and top of the head reddish brown, spotted with blackish on the occiput.

Pachyrhamphus cinereiventris *Scl.* Six adults, both sexes, Boruca, Barranca Puntarenas, Paso Real and Pozo del Rio Grande, May, July and August.

Lathria unirufa clara *Ridgw.* Two adults, male and female, Pozo del Rio Grande, April 5 and 17.

Attila citreopygia citreopygia (*Bonap.*). Four adults, both sexes, Boruca and Pozo del Rio Grande, April and May.

Attila citreopygia luteola *Ridgw.* One adult male, Pozo del Rio Grande, April 15.

Mr. Ridgway kindly identified these five skins of *Attila* and decided that four of them were referable to true *citreopygia* and one to *luteola*, from which it seems reasonable to infer that the Rio Grande region of Costa Rica is the meeting ground of these two races.

Microtriccus semiflavus semiflavus (*Scl. & Salv.*).[1] One adult male, Boruca, May 4, 1906.

Chasmorhynchus tricarunculatus *J. & E. Verr.* One female, Pozo del Rio Grande, April.

[1] See Ridgway, Proc. Biol. Soc. of Washington, Vol. XVIII, p. 210, Sept. 2, 1905.

TURDIDÆ.

Planesticus grayi casius (*Bonap.*). Six specimens, one adult male and five young, Boruca, April and May.

Planesticus tristis cnephosa (*Bangs*). Forty-four specimens, adults and young of both sexes, Boruca, April–July.

Hylocichla ustulata swainsonii (*Cab.*). Three specimens, Boruca, and Pozo del Rio Grande, April 21 and 30, and May 3.

Catharus griseiceps *Salvin.* Twenty-two specimens, adults and young of both sexes, Boruca, Paso Real, and Barranca, April–July.

These skins average slightly different from specimens from Chiriqui, being a little paler — whiter — on throat, with the tail and upper tail coverts slightly redder, and the under tail coverts more fulvous. The differences, however, are slight and not altogether constant, and as the Costa Rica specimens were taken in spring and summer and the Chiriqui birds, with which I have compared them, in winter, the slight color differences noted may be seasonal.

The species is new to the ornis of Costa Rica.

Catharus melpomene costaricensis *Hellmayr.* Two young, male and female in nestling plumage, Boruca, July 8 and Barranca, June 28. No adults of this species were taken, but the young are easily recognized, and quite different from the corresponding plumage of *Catharus griseiceps*. These two specimens were identified by Mr. Ridgway.

SYLVIIDÆ.

Polioptila superciliaris superciliaris *Lawr.* Thirty-one specimens, adults and young of both sexes, Boruca, Paso Real, Pozo del Rio Grande and Barranca, April–August.

TROGLODYTIDÆ.

Heleodytes capistratus capistratus (*Lesson*). One adult male, Barranca, August 13.

Pheugopedius fasciato-ventris melanogaster (*Sharpe*). Sixty-eight specimens, adults and young of both sexes, Boruca, Pozo del Rio Grande and Barranca, April–August.

Pheugopedius hyperythrus (*Salv. & Godm.*). Fifty-six specimens, adults and young of both sexes, Boruca and Paso Real, April–July.

These are slightly darker and richer tawny below than Panaman examples.

Troglodytes musculus inquietus (*Baird*). Two males, one adult May 17, the other young June 19, Boruca.

The taking of these two specimens positively extends the range of this form to western Costa Rica. I wholly agree with Mr. Ridgway's opinion expressed on page 571, footnote, of 'Birds of North and Middle America,' Part III, that *T. intermedius* is specifically distinct from *T. inquietus*. I have never seen any indication of intergradation among the many specimens I have examined.

Henicorhina prostheleuca pittieri (*Cherrie*). Seventeen specimens, adults and young of both sexes, Boruca, May–July.

Thryophilus semibadius (*Salv.*). Nineteen specimens, adults and young of both sexes, Boruca, Paso Real, Pozo del Rio Grande and Lagato, April–July.

Thryophilus pleurostictus ravus *Ridgw.* Four specimens, two adult males and a young male and young female, Barranca Puntarenas, August.

Thryophilus rufalbus castanonotus *Ridgw.* Fifteen specimens, adults and young of both sexes, Boruca, Paso Real and Lagato, May and July.

Thryophilus modestus modestus (*Cabanis*). Twenty-two specimens, adults and young of both sexes, Boruca, Paso Real, and Pozo del Rio Grande, April–August.

Skins from the Rio Grande region of Costa Rica are not extreme *T. modestus*, but are intergrades between that form and *T. modestus elutus*; on the whole, however, I think them rather nearer to *modestus* than to *elutus*.

VIREONIDÆ.

Vireosylva flavoviridis flavoviridis *Cassin.* Nineteen specimens, adults of both sexes and two young, Boruca, Paso Real, and Barranca, April–July.

Vireosylva philadelphica *Cassin.* One female, Boruca, May.

Pachysylvia decurtata (*Bonap.*). Twenty-four specimens, adult and young of both sexes, Boruca and Pozo del Rio Grande, May–August.

This series does not average any smaller than specimens in my collection from Vera Cruz, Mexico, neither can I detect any constant differences in coloration, and I am inclined to believe the southern subspecies *pusillus* of Lawrence cannot be maintained, although Ridgway, 'Birds of North and Middle America,' Part III, page 217, footnote, seemed rather to think it might.

Pachysylvia ochraceiceps pallidipectus *Ridgw.* Thirty specimens, adults and young of both sexes, Boruca, Paso Real, Lagato, Barranca and Pozo del Rio Grande, April–August.

Young in nestling plumage are very different in color from adults, having the entire upper parts dark cinnamon, and the under parts, except under tail coverts which are greenish yellow, pale cinnamon mixed with whitish — the throat mostly whitish. From this plumage they moult into the livery of the adult; three skins in the above series being in process of such a change.

Pachysylvia viridiflava (*Lawr.*). One adult male, Boruca, June 16.

HIRUNDINIDÆ.

Progne chalybea chalybea (*Gmel.*). Seven specimens, adults and young of both sexes, Boruca and Paso Real, May and July.

Stelgidopteryx ruficollis uropygialis (*Lawr.*). One adult female, Pozo del Rio Grande, April 4, 1906.

Iridoprocne albilineata (*Lawr.*). Eight specimens, adults and young of both sexes, Barranca Puntarenas, August.

Pygochelidon cyanoleuca (*Vieill.*). Sixteen specimens, adults and young of both sexes, Boruca, Paso Real and Barranca, May–July.

MNIOTILTIDÆ.

Chrysocantor æstiva æstiva (*Gmel.*). Four specimens, two males, two females, Boruca and Pozo del Rio Grande, April 10 to April 27.

Dendroica pensylvanica (*Linn.*). Two males, Pozo del Rio Grande, April 6 and April 9.

Oporornis formosa (*Wilson*). Two males, Pozo del Rio Grande, April 4 and April 17.

Oporornis philadelphia (*Wilson*). Three specimens, two males and a female, Boruca and Pozo del Rio Grande, April 11 to April 27.

Seiurus aurocapillus (*Linn.*). Four specimens, both sexes, Boruca and Pozo del Rio Grande, April 12 to May 6.

Seiurus noveboracensis noveboracensis (*Gmel.*). One male, Pozo del Rio Grande, April 8.

Chamæthlypis caninucha *Ridgway.* Eighteen specimens, adults and young of both sexes, Boruca, Paso Real and Barranca, May–July.

Young in nestling plumage, besides lacking all gray and black markings on the head, differ from the adults in the color of the under parts which are dull olive-yellow.

Icteria virens virens (*Linn.*). One female, Pozo del Rio Grande, April 9.

Basileuterus rufifrons delattrii (*Bonap.*). Seven adults, both sexes, Boruca and Paso Real, April, May and July.

Basileuterus semicervinus veraguensis (*Sharpe*). Eleven specimens, adults of both sexes and one nestling female, Boruca and Paso Real, April, May and July.

This series presents much variation, and some skins are very close to *B. semicervinus leucopygius* (Scl. & Salv.) if not really referable to that form, while others are typical *B. s. veraguensis.*

Rhodinocichla rosea eximia *Ridgw.* Thirty-three specimens, adults of both sexes, immature of both sexes and two nestlings, both male. Boruca, April–July.

CŒREBIDÆ.

Chlorophanes spiza exsul *Berlepsch.* Ninety-one specimens, adults and young of both sexes, Boruca and Paso Real, April–July.

This series is, like Chiriqui specimens, wholly referable to *C. spiza exsul,* which in my opinion is an excellent form. The very short bill of *exsul,* which in the adult male averages about 15 mm., at once distinguishes it from the northern *guatemalensis* with a bill of 17.5 mm.

Cyanerpes cyaneus (*Linn.*). Sixty-nine specimens, adults and young of both sexes, Boruca, Paso Real and Lagato, April–July.

Cyanerpes lucidus isthmicus subsp. nov.

Five specimens, four adult males, one adult ♀ (?), Boruca and Paso Real, July.

Type, from Paso Real, Costa Rica, adult ♂, No. 18325, coll. of E. A. and O. Bangs. Collected July 22, 1906, by C. F. Underwood.

Characters. Similar to true *C. lucidus* of Guatemala, but smaller with shorter and much more slender bill; the adult male with the blue color of the body darker (in true *C. lucida* body and head are of about the same shade, in the new form the body is darker than the head, the latter being of the same light blue color as in true *C. lucida*); adult female rather duller green on the back, and with the head less washed with bluish.

Measurements.

No.	Sex.	Locality.	Wing.	Tail.	Culmen.
18324[1]	♂ ad.	Paso Real, C. R.	54	25	19
18325	♂ ad.	"	54	25.5	18.5
18326	♂ ad.	"	56.5	27	17.5
18327	♂ ad.	"	55	27	18
17292	♂ ad.	Pozo Azul, C. R.	55	26	17.5
17293	♂ ad.	"	55.5	27	16.5
17294	♂ ad.	"	55	25	17
18317	♂ ad.	"	57	28	16.5
18320	♂ ad.	"	56	25	16
40319[2]	♂ ad.	Panama, Pan.	56	28	17
32010	♂ ad.	Panama, line of R. R.	52	24.5	16.5
128418	♂ ad.	Escondido R., Nic.	56	26	17
17290[1]	♀ ad.	Pozo Azul, C. R.	54	26	17
18315	♀ ad.	"	53	26.5	16

For comparison with these a series of true *Cyanerpes lucidus* affords the following:

Measurements.

No.	Sex.	Locality.	Wing.	Tail.	Culmen.
20407[2]	♂ ad.	Choctum, Guat.	60	31	19.5
60037	♂ ad.	Guatemala	60.5	30	19.5
147809	♂ ad.	"	61	32	18.5
147810	♂ ad.	"	59	32	19
10149[1]	♂ ad.	Ceiba, Hond.	60	29.5	20.5
10150	♂ ad.	"	59.5	30	20
10151	♂ ad.	"	61.5	32.5	20
10153	♂ ad.	"	62	32	19.5
10155	♂ ad.	"	59	31.5	19
10156	♂ ad.	"	59.5	29.5	20
10157	♂ ad.	"	61	30	20
10158	♂ ad.	"	57.5	28	19
10159	♂ ad.	"	60	31	19
10160	♂ ad.	"	60	32.5	19

[1] Coll. of E. A. and O. Bangs.
[2] Coll. of U. S. National Museum.

Remarks. The two geographical races into which *Cyanerpes lucidus* divides are easily separated by the measurements, as given above; the color differences are not altogether constant, though they show very well in series.

True *Cyanerpes lucidus*, originally described from Guatemala by Sclater and Salvin, I should restrict to Guatemala, Honduras and Salvador and call all specimens from Nicaragua, Costa Rica and Panama *Cyanerpes lucidus isthmicus*. Specimens from eastern Costa Rica and from Nicaragua show some signs of being intermediate, but still, on the whole, go better with the more southern race than with true *C. lucidus*.

The distribution of these two races of *C. lucidus* conforms to that of many species of birds that occupy the same area in Central America and points to a general faunal division, the exact lines of which vary a little, separating the biota of northern and southern Central America.

Dacnis cayana callaina *Bangs*. Nine specimens, adults of both sexes and young males, Boruca and Paso Real, May and July.

Dacnis venusta *Lawr.* Five males, four adult, one young, Boruca, May and June.

Cœreba mexicana (*Sclater*). Thirty-six adults, both sexes, Boruca, Barranca, and Pozo del Rio Grande, April–August.

ICTERIDÆ.

Cacicus microrhynchus (*Scl. & Salv.*). Four adults, both sexes, Pozo del Rio Grande and Lagato, April and May.

Amblycercus holosericeus (*Licht.*). Thirty-seven specimens, both sexes, Boruca and Pozo del Rio Grande, April–August.

Icterus spurius (*Linn.*). One adult male, Pozo del Rio Grande, August 10.

TANAGRIDÆ.

Euphonia gracilis (*Cabanis*). Nine specimens, adults of both sexes and young, Boruca, Paso Real, Barranca and Pozo del Rio Grande, June–August.

Euphonia luteicapilla (*Cabanis*). Twenty-eight specimens, adults of both sexes and young, Boruca, and Paso Real, April–July.

Euphonia minuta humilis (*Cabanis*). Two males, neither quite adult, Boruca, May.

Euphonia crassirostris *Sclater*. Three males, none of them fully adult, May and July.

Calospiza guttata chrysophrys (*Scl.*). Four specimens, adults of both sexes and one young male, Boruca and Barranca, June.

Calospiza gyroloides (*Lafr.*). Thirty-eight specimens, adults and young of both sexes, Boruca and Barranca, April–June.

Calospiza larvata fanny (*Lafr.*). Forty specimens, adults and young of both sexes, Boruca and Paso Real, April–July.

Tanagra cana *Swains.* Three specimens, an adult male and two young females, Boruca, May.

Piranga testacea testacea *Scl. & Salv.* Two adult males, Boruca and Paso Real, June and July.

Ramphocelus costaricensis *Cherrie.* Two hundred and nine specimens, adults and young of both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Lanio melanopygius *Salv. & Godm.* Eight adults, both sexes, Boruca and Pozo del Rio Grande, April and May.

Tachyphonus nitidissimus *Salv.* Twenty-seven specimens, adults of both sexes and young males, two in nestling plumage, Boruca, Paso Real, Barranca and Pozo del Rio Grande, April–July. The color of the crown-patch in the adult males varies much — from gamboge yellow to almost ochraceous-rufus, sometimes being yellow in middle and ochraceous at the end or sides.

Eucometis spodocephala stictothorax (*Berlepsch*). Thirty-seven specimens, adults and young, Boruca, Paso Real, Pozo del Rio Grande and Lagato, April–August.

This series clearly is referable to *E. spodocephala stictothorax* and not to true *E. spodocephala* although some individuals approach the latter form and perhaps indicate intergradation somewhere in this vicinity; others — in fact most of the series — are extreme instances of the more southern subspecies. Specimens from Pozo Azul, Costa Rica, I should also refer to *stictothorax*, while examples from Volcan Miravalles are extreme *spodocephala*.

Young specimens in nestling plumage have the whole head and throat olive-green like the back, and the chest streaked with this color, otherwise they are similar to the adults.

Phœnicothraupis rubica vinacea (*Lawr.*). Sixty-two specimens, adults and young, Boruca and Lagato, April–June.

Nestlings are much browner, less greenish than the adult female and lack the yellow crown patch.

FRINGILLIDÆ.

Spiza americana (*Gmel.*). Five adults, both sexes, Pozo del Rio Grande, April 3 to April 12.

Emberizoides sphenura hypochondriacus (*Hellmayr*).[1] Seven adults, both sexes, Boruca and Barranca, May and June.

This strongly characterized subspecies, lately described by Hellmayr, is of course a new bird to Costa Rica. It was very surprising after all the

[1] *Emberizoides macrourus hypochondriacus* Hellmayr, Bull. Br. Orn. Club, Vol. XIX, Dec. 31, 1906, p. 28. Type locality, Frances, Volcan de Chiriqui, 2000 ft. alt.

Dr. Chas. W. Richmond has called my attention to the fact that *Fringilla macroura* Gmel. 1788, is preoccupied by Pallas in Vroeg's Catalogue 1764, and that therefore the wide ranging South American species must be known by Vieillot's name *Passerina sphenura*, N. Dict. d'Hist. Nat., XXV, p. 25, 1817, Type locality, Cayenne.

bird collecting that has been done in Panama, Chiriqui and Costa Rica to find a bird of this genus inhabiting Central America, and still more so that it should have been taken by two collectors in two different regions so nearly at the same time.

At Boruca and Barranca Mr. Underwood did not find the bird living in marshes as *Emberizoides sphenura* is said to do in South America, but inhabiting small patches of a low green shrub in open places in and near the forest. It kept concealed in these low bushes, was very hard to flush, and had to be shot upon the wing as it darted from one clump to another, and I fancy it is a bird that might easily be overlooked by collectors.

Arremonops superciliosus superciliosus (*Salvin*). One adult female, Boca Barranca Puntarenas, Aug. 14.

Arremonops conirostris richmondi *Ridgw.* Thirty specimens, adults and young, Boruca, Barranca, Lagato and Pozo del Rio Grande, April–August.

Arremon aurantiirostris *Lafr.* Eighty-eight specimens, adults and young, Boruca, Paso Real, Barranca, Lagato and Pozo del Rio Grande, April–August.

Buarremon costaricensis sp. nov.

Fifty-two specimens, adults of both sexes and one young female in nestling plumage, Boruca, Barranca and Lagato, April–July.

Type, from Boruca, Costa Rica, adult ♂, No. 18606, coll. of E. A. and O. Bangs. Collected July 1, 1906, by C. F. Underwood.

Characters. Somewhat similar to *B. assimilis* (Boissoneau), to which species it has usually been referred, of South America — Colombia and Venezuela to Peru — but larger; with larger, both longer and stouter, bill; and shorter and apparently (judged from dried specimens) heavier tarsus; color of back, etc., much clearer olive-green, less reddish olive; flanks and under tail coverts greener, less brownish; gray parts of head and sides of neck paler, clearer gray; bend of wing brighter, clearer yellow; nearly, usually entirely, lacking the whitish spot on forehead above middle of base of culmen so conspicuous in *B. assimilis*.

Measurements.

No.	Sex.	Locality.	Wing.	Tail.	Tarsus.	Culmen.
18606	♂ ad.	Boruca, C. R.	84	76	28	18
18596	♂ ad.	"	85	78	27.5	18.5
18597	♂ ad.	"	85.5	79	27	18
18609	♂ ad.	"	82	72	26.5	17
18607	♂ ad.	"	85	77	27.5	19
18601	♂ ad.	Lagato, C. R.	80	78	28	17.5
18592	♀ ad.	Boruca, C. R.	78	76	28	17
18599	♀ ad.	"	80	74	27	17.5
18600	♀ ad.	"	79	74	26	17
18605	♀ ad.	"	81	75	26.5	17.5
18608	♀ ad.	"	78	75	26	17
18611	♀ ad.	"	80	72	26.5	17

Three "Bogota" skins of *Buarremon assimilis* measure respectively as follows: wing, 79, 78, and 79.5; tail, 78, 75 and 78; tarsus, 30, 30 and 30; culmen, 16, 16 and 15.5.

Remarks. Lawrence, in 1868, very doubtfully referred to *Buarremon assimilis* a specimen from Guiatil, Costa Rica, he then had in hand, pointing out differences between it and South American examples; Salvin, however, afterward examining the same skin, came to the conclusion it did not differ at all from South American examples.

The large series taken by Underwood shows very pronounced and constant differences from *B. assimilis* of Colombia and southward, and as no bird of this sort has ever been taken in Chiriqui or Panama, I am inclined to accord the Costa Rican Buarremon full specific rank.

Though wholly wanting or exceedingly rare in other parts of Costa Rica, Underwood found *Buarremon costaricensis* an abundant bird in the Rio Grande region.

Volatinia jacarini splendens (*Vieill.*). Thirteen specimens, both sexes, Boruca and Paso Real, May–July.

Sporophila gutturalis (*Licht.*). One adult male, Pozo del Rio Grande, April 18.

This is a new bird to Costa Rica, and I believe has before been taken on the continent no farther north than on the line of the Panama Railroad.

Sporophila aurita (*Bonap.*). Thirty-eight specimens, adults of both sexes and young males, Boruca, Paso Real, Barranca and Pozo del Rio Grande, April–August.

The adult males from this series — twenty-one in number — show, for this species, remarkably little individual variation, there being no very black ones and none with white throats. All have black throats and breasts, white rumps and bellies and a semicircle of white on each side of the neck, are practically all alike, and represent the phase of plumage named by Lawrence *S. semicollaris*, except that the rump is slightly more extensively white.

Sporophila morelleti morelleti (*Bonap.*). Four specimens, two adult males, one young male and one young female, Pozo del Rio Grande, April and August.

Amaurospiza concolor *Cabanis.* One adult male of this rare species, Boruca, June 16, 1906.

Cyanocompsa concreta cyanescens *Ridgw.* Forty-nine specimens, both sexes, Boruca, Paso Real and Pozo del Rio Grande, April–August.

Oryzoborus funereus *Sclater.* Four adults, both sexes, Boruca and Barranca, June.

Saltator magnoides intermedius (*Lawr.*). Eighteen specimens, adults of both sexes and one young in nestling plumage, Boruca, Barranca, Pozo del Rio Grande and Barranca Puntarenas, April–August.

These skins represent *S. magnoides intermedius*, differing in no way from specimens from Panama, except that in the series there is not an example with the black band across the chest broken or wanting; the

band, however, is very narrow, and many Panaman examples are precisely like these Rio Grande specimens.

The bird of eastern Costa Rica is *S. magnoides medianus* Ridgw.; not usually so extreme as more northern specimens, but clearly to be referred to that form.

Saltator striatipectus isthmicus (*Sclater*). Forty-six specimens, both sexes, Boruca and Lagato, April–July.

ANOTHER HYBRID HUMMINGBIRD — *SELASPHORUS RUFUS* + *ATTHIS CALLIOPE* — FROM CALIFORNIA.

BY JOHN E. THAYER AND OUTRAM BANGS.

SHORTLY after the death of Walter E. Bryant his collection of beautifully mounted Californian Hummingbirds came into the possession of Thayer and is now in the Thayer Museum at Lancaster, Mass. In this collection we found, while identifying the species, a remarkable hybrid apparently of *Selasphorus rufus* and *Atthis calliope*. It was shot at Oakland, California, May 8, 1896, while feeding on locust blossoms.

In color this example, which is a fully adult male, is somewhat intermediate between adult males of the two species of which it is probably a hybrid.

The back is green, duller and more coppery than in *Atthis calliope*, the upper tail coverts and rectrices are edged with rufous, the rufous edging reaching nearly to the tips of the feathers on the inner webs of the rectrices and about to the middle on the outer webs; the cheeks, sides of body and under tail coverts are all clouded with rufous; the gorget, composed of feathers more pointed and narrower than in *Selasphorus rufus*, with the white bases showing slightly through, is of the most gorgeous ruby red, different from that of either *Selasphorus rufus* or *Atthis calliope*; the shape of the rectrices corresponds rather better with male examples of *Selasphorus rufus*, the outer rectrices being narrower and pointed, but the tail is short and more nearly square as in *Atthis calliope*.

The original label bore an inscription to the effect that the specimen was to be recorded in 'The Auk' by R. C. McGregor, the volume and page not, however, filled out. Turning to the volumes of 'The Auk' we find on page 91, Vol. XIV, 1897, a note by R. C. McGregor entitled "Broad-tailed Hummingbird in California." Here the author mentions an adult male which he identified as *Selasphorus platycercus* taken at Oakland, May 8, 1890, and in the mounted collection of Walter E. Bryant. This is probably the bird we have before us now, because there certainly was not a specimen of *Selasphorus platycercus* in Mr. Bryant's mounted collection from Oakland, and we believe McGregor made an error in the date, giving "1890" for 1896.

Mr. Robert Ridgway has very kindly examined the specimen with much care and agrees with us as to its hybrid character and probable parentage.

All students of the Trochilidæ well know how prone these birds are to hybridize, and from California alone four different hybrids are now recorded:

Selasphorus floresii = *Selasphorus alleni* + *Calypte anna*; *Trochilus violajugulum* = *Trochilus alexandri* + *Calypte anna*; *Trochilus alexandri* + *Calypte costæ* (not named); and *Selasphorus rufus* + *Atthis calliope* (not named), the subject of the present note.

LIST OF THE BIRDS OF LOUISIANA.

BY GEO. E. BEYER, ANDREW ALLISON, AND HENRY H. KOPMAN.

PART III.[1]

1. HORNED GREBE (*Colymbus auritus*). A regular winter visitor, not at all uncommon from November until the end of March. It is usually found in flocks of from five to ten individuals, especially on the lagoons and wide bayous of the southern section of the State. It is not at all shy, but rather inquisitive, often swimming quite up to the hunter's duck blinds. It does not seem to associate with water birds of other species.

2. PIED-BILLED GREBE (*Podilymbus podiceps*). Resident; numbers greatly increase during winter, when one or two may be seen in almost every water hole in suitable localities. As a migrant, it arrives in the lower parts of the State about the end of October, while its numbers are greatly diminished about the middle of March.

3. LOON (*Gavia imber*). A common winter resident on the Gulf waters; fairly common also on the larger bodies of water far inland. The usual time of arrival is the latter part of October, though it has been observed on Bay St. Louis, Miss., August 11, 1900, and in the same locality during September, 1896. The last are seen about the middle of April. (One was seen at Biloxi, Miss., April 22, 1906.)

4. HERRING GULL (*Larus argentatus*). Very common from late fall to early spring, and present from about October 15 to April 15. It is found chiefly along the coast and on the lakes of the southern section. It is common on the Mississippi at New Orleans, as are the Ring-billed and Laughing Gulls. This species and the Ring-billed Gull are especially common about oyster canneries, as at Timbalier Bay.

5. RING-BILLED GULL (*Larus delawarensis*). Common in practically the same localities and at the same seasons as the preceding.

6. LAUGHING GULL (*Larus atricilla*). Though it appears to be restricted as a breeder to the islands along the coast, it ranges over a large part of the State at nearly all seasons, usually following the courses of the rivers. It is rarely if ever observed on the Mississippi at New Orleans during summer, though it may be seen at that season on Lake Pontchartrain, five miles away. There are no nesting colonies on the shores of Lake Pontchartrain, however.

7. FRANKLIN'S GULL (*Larus franklinii*). A fairly regular, but never common, winter visitor on the western Gulf coast, and about the passes near the mouth of the Mississippi River.

8. BONAPARTE'S GULL (*Larus philadelphia*). Like the preceding, a regular but not abundant winter visitor. It arrives in September and

[1] For Parts I and II, see Volume XXIII, pp. 1–15, 275–282.

leaves about the middle of April. It is usually found in company with the other gulls, on the coast or in the interior.

9. GULL-BILLED TERN (*Gelochelidon nilotica*). Resident on the western coast and its islands, frequenting shallow waters near the shore, and breeding in July and August. It is not abundant, occurring singly and in flocks of three or four, in company with other gulls and terns.

10. CASPIAN TERN (*Sterna caspia*). Resident; fairly common along the coast, breeding on low sandy islands; numbers increased in winter; it occurs singly or in flocks of two or three, and associates freely with other gulls and terns, often congregating about the oyster and shrimp canneries. It never occurs far from the coast.

11. ROYAL TERN (*Sterna maxima*). Resident; very common along the entire extent of the coast; breeds in June and July in about the same situations as the Caspian Tern. If one set of eggs is destroyed by a storm, a second set is laid. Like the preceding, it flies singly or in small flocks, though frequently hundreds may be in sight at one time. After the breeding season, it roams inland, and may be found in fall and winter on inland waters, especially in the northwestern part of the State. It probably never occurs on the Mississippi River except very near the mouth.

12. CABOT'S TERN (*Sterna sandvicensis acuflavida*). Fairly common resident, numbers increasing, however, about the end of September. In distribution, it is chiefly a seabird, being especially common on the Chandeleur Islands and Breton Island.

13. FORSTER'S TERN (*Sterna forsteri*). Resident on the larger Gulf islands, but in very limited numbers; it grows commoner in fall, occurring both inland and coastwise.

14. LEAST TERN (*Sterna antillarum*). An abundant resident in all suitable localities along the coast. Has been observed also at Vicksburg in the middle of July, and a few miles westward, near Tallulah, in Madison Parish, Louisiana, where it appeared to be well established, though no evidence of its breeding there was secured. Those seen in Madison Parish were observed repeatedly flying along a slough. In fall and winter, it is regularly seen far inland in flocks of eight or ten.

15. SOOTY TERN (*Sterna fuliginosa*). This species has about the same breeding range on the coast as the preceding, and is frequently associated with it.

16. BLACK TERN (*Hydrochelidon nigra surinamensis*). A common transient in spring and fall; it arrives from the north early in August, and has been seen at Bay St. Louis, Miss., as early as July 26. It occurs chiefly coastwise, but was seen at New Orleans, August 15, 1901, during a Gulf hurricane.

17. NODDY TERN (*Anous stolidus*). Resident, but never common; breeds on some of the islands, especially Timbalier and Chandeleur.

18. BLACK SKIMMER (*Rhynchops nigra*). A common resident along the coast, breeding on most of the islands, and in some places along the shore of the mainland. Usually flies in flocks of ten or more. In habit,

somewhat crepuscular, in this particular being unlike the gulls and terns.

19. BOOBY (*Sula sula*). Though this species doubtless occurs in Louisiana at all seasons, it should be regarded as an uncommon and irregular visitor from further south, rather than as a resident. Specimens were taken in September, 1884, on the Mississippi about fifty miles below New Orleans, and three were observed at Red Pass, near the mouth of the Mississippi, on January 15, 1901.

20. GANNET (*Sula bassana*). This species is an occasional winter visitor; it has been observed several times at the Rigolets, in southeastern Louisiana. Like the preceding this species seems to occur unassociated with any other species except possibly the cormorants.

21. ANHINGA (*Anhinga anhinga*). Resident along the Gulf coast, following the rivers and larger bayous inland, and preferring open swamps, especially those of cypress and tupelo, for its nesting places. In the breeding season it is associated with several of the herons, especially the Great Blue Heron, the American Egret, and the Little Blue Heron. The breeding season includes most of May, June, and July. There are usually three birds to a brood. This species has been found breeding in willows in an abandoned and flooded rice field on the edge of a swamp near the Mississippi in Plaquemines Parish. Nearly a dozen nests have been seen in a single clump of willows. The nests in this case were mere platforms, something over a foot in diameter, and having moderate depressions. The behavior of the young at the conclusion of the nesting period is often peculiar. A nestling almost fully fledged has been seen to fall precipitately from a branch of its nest-tree, on the approach of a person, striking the marsh below head first, and emitting a strange, harsh note in its descent. The adults resent the presence of intruders about a nesting colony by flying back and forth and uttering peculiar hissing notes. The attitude of both young and old when perched on the trees of a site selected for a nesting colony is often peculiar. The adults frequently sit with their wings extended for considerable intervals, while the young huddle together in attitudes that frequently suggest a hawk. Under such circumstances, on account of the coloring of the young at a certain period, the resemblance to the Red-shouldered Hawk is marked.

Although this species occurs commonly along the coast, it does not breed on or near salt water.

While the Anhinga is resident in Louisiana, it is always much more conspicuous in summer, at which season it is not unusual to see these birds soaring at considerable heights in the localities where they breed. The Anhinga resorts with much regularity to the same nesting sites every year.

22. DOUBLE-CRESTED CORMORANT (*Phalacrocorax dilophus*). This is a winter resident, not common, and found almost exclusively along the Gulf coast. Three or four are usually seen together. It has been seen on Lake Catherine as late as April 14 (1904).

23. FLORIDA CORMORANT (*Phalacrocorax dilophus floridanus*). This species is much commoner than the preceding, though found in the same

localities. It breeds wherever it occurs. It is usually seen in flocks of from six to ten. The distribution and abundance of this species is practically unchanged throughout the year.

24. MEXICAN CORMORANT (*Phalacrocorax mexicanus*). In the lower sections of the State, this species is a common resident, and in habits, distribution, etc., agrees closely with the preceding species. Like the others, it is occasionally found inland on the larger bodies of water.

25. BROWN PELICAN (*Pelecanus fuscus*). This species is abundant along the Gulf coast, especially about the islands. It usually occurs in flocks of less than twenty. Although essentially a coast bird, it straggles inland in winter, though very rarely leaving the southern part of the State. It breeds almost exclusively on the coastwise islands in company with gulls and terns.

26. WHITE PELICAN (*Pelecanus erythrorhynchus*). This is a winter visitor only, and never occurs in very large numbers. It occurs chiefly along the coast, but is occasionally found inland about the larger bodies of water. Numbers sometimes winter at various points along the Mississippi River, even in the northern part of the State. It is present from about October 1 to March 1.

27. MAN-O'-WAR BIRD (*Fregata aquila*). Resident and breeding along the Gulf coast, especially the eastern part. The breeding season includes most of June, July, and August. Little is seen of this species along the mainland during the breeding season, but about August 1 it becomes rather conspicuous at some points on the coast. In calm weather numbers may often be seen soaring at a considerable height. During heavy storms, this species is sometimes driven a considerable distance inland.

28. AMERICAN MERGANSER (*Merganser americanus*). Regular winter visitor, but of late years less common; in fact, its numbers seem to be slowly but steadily decreasing. It is found chiefly in small flocks along the coast, and seldom remains long on inland waters.

29. RED-BREASTED MERGANSER (*Merganser serrator*). Like the preceding, a winter visitor, but much commoner. It is usually seen in small flocks, however. On inland waters, it is rather common. Being more of a maritime species than the following, however, it is called by the creoles "Bec-scie *de mer*."

30. HOODED MERGANSER (*Lophodytes cucullatus*). Essentially an abundant winter visitor; yet a few remain throughout the year, while reports of its nesting are rather numerous. It is known to breed in the interior as well as coastwise; very young birds have been observed the latter part of June. The localities in which this species occurs as a breeder frequently change from season to season. Local (Creole) name: Bec-scie (Saw-bill).

31. MALLARD (*Anas boschas*). One of the best known of the ducks in Louisiana, being a winter visitor throughout the State and usually occurring in flocks of from ten to one hundred individuals. The first arrive early in October, but most of these appear to be transients.

It is not until the early part of November that the species becomes common. The earlier arrivals are particularly associated with Green-winged Teals and to a considerable extent also with Pintails, Gadwalls, Baldpates, Ring-necks, and Shovellers. The bulk of winter visitors are present from the early part or middle of December until the latter part of January, the Mallard being among the very first ducks to start north at the close of winter. A good many of the individuals arriving at the beginning of the winter pass further south, returning when the last of the winter bulk are leaving the State, so that the greatest number are often present at the beginning and at the end of the season. It is doubtful whether any of the winter visitor individuals remain in southern Louisiana later than February 15. Most of the transients have disappeared by the middle of March at the latest. (Obs. In a general way, the movements here traced with reference to the Mallard, apply with more or less force to most of the other river ducks. Exceptions will be noticed under the accounts of the several species.)

Owing to constant persecution along the coast, the Mallard, like other ducks wintering in Louisiana, is very wary; the feeding grounds in the marshes are ordinarily deserted by daybreak, and open waters are generally frequented during the hours of daylight.

Several peculiar specimens of the Mallard have been taken in Louisiana. Three of these were partly albino; one was a male and the others females; all were marked exactly alike; they were shot at Vinton, in southwest Louisiana on January 4, 1892. An exceedingly strange specimen is a hybrid between the Mallard and Pintail; the bird was an apparently fertile drake. One side bears the exact markings of the Mallard and the other of the Pintail. (For a detailed account of this specimen, see Auk, XVII, April, 1900, p. 170.)

Local names: French Duck; Canard français.

32. BLACK DUCK (*Anas obscura*). Formerly a common winter visitor, but growing steadily rarer of late years. It prefers the open Gulf waters to the inland. It is usually found in flocks of eight or ten, while sometimes a few will be found with a flock of Mallards.

33. FLORIDA DUCK (*Anas fulvigula*). A regular resident on the coast, and especially on the islands, whence its local name, *canard des isles*. It is fairly common and breeds wherever it occurs in the regions just mentioned. Its numbers are greatly increased during winter, and at that season it may be found on open lakes, even in the northern part of the State.

34. GADWALL (*Chaulelasmus streperus*). This species is one of those forming the normal winter duck population in Louisiana, and in the matter of abundance, stands about on a par with Mallards, Baldpates, Pintails, Green-winged Teals, and Lesser Scaups, being rather more abundant than Red-heads and Ring-necks. As in the case of the Mallard, the first come by the early or middle part of October, and continue to increase decidedly until the middle of December, then remaining in statu quo or showing something of a decrease, according to the nature of the winter, until the

middle of January. A strong northward movement begins at that time, and while it consists largely of individuals that have wintered in Louisiana, it is doubtless augmented also by the first passage of transients. This later movement continues more or less freely until about March 15, after which date, duck migration is restricted almost entirely to a few species, among which the Gadwall is seldom if ever found.

Local names: Gray Duck; Canard gris.

35. BALDPATE (*Mareca americana*). Though rather less common than the preceding, this species exhibits about the same movements.

Local names: Zin-zin and Widgeon.

36. GREEN-WINGED TEAL (*Nettion carolinensis*). At no time as common in Louisiana as the Blue-winged Teal becomes there in spring, the Green-winged Teal is present in large numbers for a greater period than the Blue-winged Teal. Numbers arrive in the fall not later than October 1, thus preceding most of the other species. They are particularly abundant in fall. Many remain in southern Louisiana throughout the winter, departing, with the bulk of the winter ducks, early in February. Individuals that winter extralimitally are rather late in returning, but the average time of their spring flight is much in advance of that of the Blue-winged Teal, so that the last have usually passed before April.

Local names: Cognotte; Sarcelle d'hiver (Winter Teal).

37. BLUE-WINGED TEAL (*Querquedula discors*). Leaving aside the possible occurrence of this species as a breeder in Louisiana, it is nevertheless present there for a large part of the year. Returning transients appear in Louisiana between September 1 and September 15. Individuals of this class continue common throughout the fall and with those arrivals that will remain throughout the winter make the species abundant until cold weather in November. From then on, the numbers are decidedly decreased until the middle or latter part of March, when the bulk of transients begin to arrive, the transient movement continuing in force until the first half of May, while the writers have positively recorded the species in southeastern Louisiana as late as May 21. Some hunters claim that a few of this species breed regularly in southern Louisiana, and it is not at all unlikely that such is the case. No authenticated instances, however, have come under the observation of any of the writers.

Local names: Sarcelle autonniere; Sarcelle printanniere. (Spring or Fall Teal).

38. CINNAMON TEAL (*Querquedula cyanoptera*). This species is rare in Louisiana. All specimens recorded have been taken in fall and winter in the southern part of the State.

39. PINTAIL (*Dafila acuta*). In one important particular, the movements of the Pintail in Louisiana differ from those of the Mallard, Gadwall, and associated species. The spring transients are the latest of all ducks except the teals and the Shoveller, and this in spite of the fact that winter visitant individuals, as with similar individuals of the Mallard, move northward very early, probably never later than the middle of January.

But the principal flights of transients occur in spring, even in April, during the passage of Blue-winged Teals.

Local names: Paille-en-queue (Straw-tail); Sprigtail.

40. WOOD DUCK (*Aix sponsa*). Though this species is found to a considerable extent in swampy country coastwise, the characteristic habitat of the Wood Duck in Louisiana is the heavy inland swamps about lakes or along rivers. It is extremely common, for instance, about shallow sloughs in heavy hardwood growths along the Mississippi in northeastern Louisiana. The dense forests along the lower course of the Atchafalaya, however, and some of the swamps about lakes and rivers in southwest Louisiana are likewise very attractive to this species. An undoubted factor in determining the abundance of the Wood Duck is the presence of the water-chinquapin (*Nelumbium luteum*). As a food of the Wood Duck the seeds of this plant are extremely important.

In the southern part of the State at least, the Wood Duck is seldom seen in winter. Nesting usually begins in the early part of April.

Local name: Brancheur (percher).

41. RED-HEAD (*Aythya americana*). This species is rather common coastwise and is found chiefly from the middle of November to the middle of February.

Local names: Violon (Violin).

42. CANVAS-BACK (*Aythya vallisneria*). The numbers of this species are probably on a steady decline. There are certain little-visited localities, however, especially near the mouth of the Mississippi, where it still occurs in considerable abundance during some seasons. Like the Red-head, it prefers the coast; its migratory movements, also, are similar to those of the Red-head.

Local names: Canard cheval.

43. AMERICAN SCAUP (*Aythya marila*). The occurrence of this species is confined chiefly to the colder parts of the winter. This species is seldom found away from the coast, and occurs more frequently on the open Gulf waters than any other species. In distinction from the next, it is called by the Creoles "Dos-gris de mer."

44. LESSER SCAUP (*Aythya affinis*). This duck is probably steadily commoner than any other species found in Louisiana. It is present from about October 15 to March 15. It is most abundant, of course, in the southern part of the State. At times, it occurs in large flocks; again, many single individuals may be seen on the inlets and salt lakes of the southeastern part of the State.

Local name: Dos-gris (Grayback).

45. RING-NECKED DUCK (*Aythya collaris*). This is a common winter visitor; its movements are about the same as those of the Lesser Scaup.

Local names: Black Duck; Canard noir.

46. AMERICAN GOLDEN-EYE (*Clangula clangula americana*). This species is a rather uncommon winter visitor; it appears to loiter in spring, and on June 15, 1894, Mr. A. B. Blakemore shot a female on Cat Island, off the coast of Mississippi.

47. BUFFLEHEAD (*Charitonetta albeola*). Common as a winter visitor. Local names: Marionette; Butterball.

48. OLD-SQUAW (*Harelda hyemalis*). A male in full winter plumage was shot on Bayou Barataria February 13, 1899. At the time of the capture of this specimen a severe blizzard was sweeping the South. Zero temperatures were reported at points near the Louisiana coast. The specimen in question is in the museum of Tulane University.

49. BLACK SCOTER (*Oidemia americana*). This species has been taken near Lake Catherine. There is a Louisiana specimen in the Kohn collection at Tulane University.

50. WHITE-WINGED SCOTER (*Oidemia deglandi*). This species is occasionally found on the Gulf Coast in winter. It rarely goes inland.

51. SURF SCOTER (*Oidemia perspicillata*). This species also is a rather rare winter visitor. A male killed on Bayou St. John, near New Orleans, on March 20, 1890, is now in the Kohn collection at Tulane University.

52. RUDDY DUCK (*Erismatura jamaicensis*). This species is a very common winter visitor. Local name: Marteau.

53. LESSER SNOW GOOSE (*Chen hyperborea*). Winters in considerable abundance along the coast.

54. GREATER SNOW GOOSE (*Chen hyperborea nivea*). Not so common as the preceding, but its movements are about the same.

55. BLUE GOOSE (*Chen cærulescens*). Rather common in winter on the coast.

56. WHITE-FRONTED GOOSE (*Anser albifrons gambeli*). Present, like most of the geese, from October to March, or the early part of April. Common.

57. CANADA GOOSE (*Branta canadensis*). The commonest of the geese in Louisiana. Its movements are about the same as those of the preceding species.

58. HUTCHINS'S GOOSE (*Branta canadensis hutchinsii*). This form is a rather common winter visitor, and is usually found on the coast.

59. BRANT (*Branta bernicla*). An occasional winter visitor.

60. FULVOUS TREE-DUCK (*Dendrocygna fulva*). Though a native of tropical and subtropical America, this species has been observed in Louisiana, not as might have been expected, in summer, but in fall and winter. Considerable flocks have been noted at various times. Its occurrence in Louisiana, however, is decidedly irregular.

61. WHISTLING SWAN (*Olor columbianus*). In recent years, the occurrence of this species in Louisiana has become very rare and irregular

62. TRUMPETER SWAN (*Olor buccinator*). In the past, this species has proved commoner than the preceding, especially about the mouth of the Mississippi.

(*To be continued.*)

AUTUMN WARBLER MIGRATION.

BY J. CLAIRE WOOD.

IN 'THE AUK,' Vol. XXIII, No. 1, January, 1906, I gave an account of the Warblers noted here in the autumn of 1905. That season I devoted my entire spare time to them from August 20 but this autumn I did not start until September 3; consequently, the following list is inaccurate as to first arrivals but I doubt if anything escaped notice from September 3 to the end of the season. A Mourning (*Geothlypis philadelphia*) and several Nashville Warblers were seen in 1904 but were absent in 1905, while the Tennessee was absent in the former season and common in the latter. This irregularity in warbler migration was interesting, and I wished to learn what percentage of species were subject to it and also to establish a better knowledge of the relative abundance and time of departure by a comparison with the present season of 1906. To get the most uniform results I hunted over the same territory, with the exception of one or two days, and the comparison was satisfactory until displaced by an abnormal change in temperature. During the night of October 9 the mercury dropped to 33°, and we had a genuine heavy snow storm on the 10th, but the snow melted as it fell. Toward evening the mercury began to drop and reached 25° at 3 A. M. on the 11th where it remained for three hours. This killed all plant life, susceptible to frost, and its blighting influence was noticeable throughout the woods on the 14th; even the live oak leaves were affected, while the beeches were a mass of yellow and no longer yielded a food supply to the warblers. With the exception of Black-throated Blue and Myrtle, all the species seen that day were hurrying south under pressure of unnatural excitement, and had probably undergone considerable hardship, as the ground was covered with half a foot of snow sixty miles north of here and about three inches at half that distance.

The woods, where I hunted, had been greatly reduced in size since 1905, and I was able to note the course of arrivals in many cases and departure in nearly all. The length of the River Range is about thirty miles and its general course approximately S. 45° E. This woods is situated on the south side and is the last piece of

thick timber as you follow down the river, there being only a grove between this point and the Detroit River. The bulk of warblers came down this water-way and during the earlier part of the season continued to the grove from whence they must have turned south, as further progress was barred by the Detroit River.[1] Later, however, my piece of timber was the limit of their eastern movement and they went due south from here to a large piece of thick woods. This was the program in 1905 except from September 20 to October 5 when they went southwest to follow a chain of large woods that extended far southward. The lesser number of warblers came from the northeast and had evidently followed the Detroit River. During September about twenty-five per cent. were apparently not migrating but taking life easy and remaining in the woods. I suppose these were the main night travelers and if so, when do migrating warblers sleep? All seen by me exhibited the characteristic activity of the family. We all know that large numbers travel by night, but who has seen them asleep during the day? Judging from my experience with night migration, they sleep from about 11 P. M. to 4 A. M. Of course, I really know nothing positively, and my belief is based only on the fact that the birds were not heard calling between the above mentioned hours, and on the actions of a captive Indigo Bunting (*Cyanospiza cyanea*). This bird was not over a month old when trapped in the summer and soon showed no desire to escape from its cage. It appeared contented, and slept peacefully all night until the advent of the fall migration; even then, there was no change in the day time, but soon after dark it became restless. The performance began with a hopping to and fro on its perch with frequent pauses to partly squat, as if about to spring into the air. At the first call note of a passing migrant it uttered a sharp metallic chirp and flew about the cage, making frantic efforts to escape and, when somewhat exhausted, climbed parrot-like about the cage top trying to force its head between the wires. Toward midnight it quieted down and slept a few hours but became active before daylight. This dominating influence ceased suddenly the latter part of October,

[1] It is an interesting fact that while the Warblers came down this water-way two thirds of the Robins took the reverse course. They mainly came from the east and had probably crossed the Detroit River, but several large flights came from the south.

and had the bird been released after that period it probably would have perished from loss of that mysterious guidance to the south, but, opposed to this, we find the latest warblers the most eager to accomplish their journey. To my mind the early migration demonstrates an instinctive movement. Nothing would seem more natural than the warblers retreating after experiencing actual contact with cold or lack of food, but the first birds are on their way long before the least intimation of cold and while food is abundant. I have seen several small flocks of juvenile Redstarts migrating July 4, and this species first reaches the West Indies the second week in August. My personal observation of their movement here extends from July 4 to October 7. What possible physical condition or prescience could maintain so uniform a southward movement over such a long period, and through seasonal changes, and all it implies, as comprehended by a comparison of July with October? Why should they migrate at all? Why has not nature modified these warblers to the condition of Chickadees? Perhaps the Myrtle Warbler is leading and the others following a gradual modification in favor of permanent northern residence. A few Myrtles winter at least as far north as Maine. At one time they were probably resident in South America and later all wintered there, and at some distant period may become entirely resident on their present breeding grounds.

My observations of the local movement inclines me to believe that the majority of warblers follow the water-ways, probably because the bordering timber is the most suitable and food more abundant. This refers mainly to the earlier birds traveling by easy stages and not handicapped for time. On occasions they do not hesitate to take a northerly course, if the woodlands are more congenial to their tastes, but that they retain a correct sense of direction is plainly shown when a point is reached where further progress would impair the southward movement. This belief is based on observations in Grosse Pointe Township and vicinity where there are no water-ways bordered by timber. Here, on September 3, I discovered a large company of mixed warblers in Gratiot Twp. and followed them about N. 45° E. across Grosse Pointe Twp. and Village of Grosse Pointe Farms to the shore of Lake St. Claire. From this point all suitable territory lay to the

north but they took the opposite direction. On the same date another flock came due east and reached the south end of a large woods. They worked through it to the northern margin and back to the starting point; thence, across the open country about S. 25° W.

From the first week in September there are always late warblers, that is, birds passing days behind the bulk of their species. As the season advances these naturally increase in numbers as more species become affected. After early September single birds or small companies are met with that have come to realize they are due miles to the south, and I doubt if they are in any way influenced from their purpose by convenient food supply, characteristic social tendency or geographical conditions. I spent many hours with the Black-throated Blue Warblers in October. They were neither uneasy nor migrating and assisted me as decoys. They always had a friendly call note for passing warblers, but with decreasing effect as the month advanced. A warbler, bent on business, does not fly from tree to tree but takes spurts of about 100 yards and, after hastily snatching a morsel or two of food, repeats the operation. One or two of the Black-throated Blue Warblers would reply to the first far away note of an approaching warbler and the bird would be sure to pass through or above the flock, exchanging greetings but seldom stopping. This often afforded me a quick wing shot but if not, I could sometimes intercept the bird at the woodland margin, as I knew the point where it would leave, and all such warblers remain longer in the last tree than anywhere while passing through the woods. A late Black-poll once joined a passing flock of Robins but they were going west and the warbler soon turned to the south. All warblers seem to me somewhat indifferent to cold, but snow inspires alarm in even the latest, and a general rapid southward movement — the Myrtle excepted.[1] Of the warblers noted October 14, three species were passing more than a month later than the bulk of their kind. In a measure, this is owing to early species getting into flocks of the later kinds and being influenced by them. Another apparent reason is the

[1] They care nothing for the snow in spring if the mercury is above freezing and the food supply not affected. The only Blue-winged Warbler seen this year was located by its song and in a blinding snow storm in early May. I also followed and watched five other species during that storm and they totally disregarded it.

reluctance of some adult birds to leave their summer quarters. A few adult male Yellow Warblers remain here at least two weeks after the last young bird has departed but, as the last of certain northern species may be represented by either or both adult and young, it would seem as if some of the lingering adults influenced a few juveniles to remain with them and sometimes left the trusting youngsters far in the rear in the wild panic to flee the country.

Satisfactory data, relative to the general distribution of autumn warblers, can only be acquired by the liberal use of a gun. Little reliance can be placed in field-glass observation and I doubt if anyone, familiar with the family, is willing to accept such records as positive in unusual cases, as when birds are exceptionally early, late or rare. Of course the adult males of a few species can be identified with certainty and a bird student, with enough knowledge to have any business in the field, should know the Myrtle in all plumages but he can get no accurate idea of the number of species in his neighborhood, their relative abundance, etc. In just one autumn I established a better knowledge of the warblers here than other parties in fifteen years of field-glass observation.[1] In order to decrease the mortality I used a field-glass as much as possible. It was very useful when warblers were near the ground or in trees to the height of about thirty feet, if the birds possessed distinctive under markings. However, it was practically useless at that

[1] I mention this because my admission, in a previous paper, of having taken specimens aroused the indignation of a certain class and appealing letters were sent to the state game warden and others. I was born a lover of birds and have always taken an interest in their welfare, but when it becomes necessary to secure them in order to do certain work well, I feel justified in doing so. However, discussion is futile but the above class should know that birds will be taken for some time to come. Probably the most effective method of determining routes is "bird tagging," and sooner or later a society will be organized to take up this work, and effective results will depend almost entirely on birds secured; furthermore, much material is at present required to permanently establish the subspecies and define their ranges. It is true that some disapprove of this "hair splitting" but for no good reason that I can see, except they are not interested in the subject or know nothing in regard to it. However, in this, as in other branches, you can not suppress the taste for knowledge and it is better to work out the problem soon as possible than allow it to drag along with forms accepted and then rejected as in the past. In his great work 'The Birds of Middle and North America,' Prof. Ridgway laments the lack of material not only in the foregoing connection but even in establishing plumage variations of actual species. Without further illustrating the necessity of securing birds at the present time suppose we look into the future centuries and we find a subject of great interest requiring a mass of new material. I refer to differentiation or modification.

height against strong light or after sundown, and very uncertain at all times when the birds were in the tall tree tops. To accomplish good results in warbler hunting requires hard work and much patience. At times the woods are apparently void of warblers, but experience has taught me that, at least, a few may be found in every suitable woods. This scarcity may occur in the height of the seasón and is probably due to drainage by a flock of travelers. If you keep constantly in motion and attend strictly to business the reward is certain, although the amount of success depends on how familiar you are with the woods or, rather, the more favorable places. The terrestrial kinds are not difficult to discover, as you can penetrate their haunts and force them from cover, but the more arboreal species can not be reached in the thick foliage of the forest trees. One of my first experiments was to climb a tree, commanding a view on all sides, and wait for the birds, but in this I was depending entirely on such as chanced in one little spot of a large woods, and even then they were more difficult to see than when looking from the ground, while it was no easy matter to mark down anything shot, and if wounded it was sure to escape before I could reach the spot. I have seen a winged Nashville and Tennessee crawl entirely out of sight beneath a dead leaf when other concealment was wanting. Another of my errors was wasting time in exploring unlikely and out of the way places, believing such localities the most liable to contain rarities. Another point, to be remembered, is that loud noises inspire alarm and the birds flee at the report of a gun; so, by the time you have picked up your specimen the remainder have vanished from sight and hearing. Never shoot into a flock without first ascertaining their direction of travel and you can then sprint one or two hundred yards and get some trace of them again. In the woods the migrating flocks are usually of many species and the beginner is liable to see only the prominent kinds. Sometimes a small company of three or four individuals will work through the woods so much scattered that there will be a hundred yards or so between each bird. They remain silent, except while flying from tree to tree when a sharp peep is uttered to keep in touch with one another. In a case of this kind success depends on quick work and some experience. It does not pay to watch the water holes, as migrating warblers will seldom come down to drink and bathe. A notable fact is that

the success of arboreal warblers in eluding detection is in no way due to wariness or sagacity. They feel absolutely safe in the tree tops and are totally indifferent to what transpires on the ground beneath. The cause is protective coloration and food habits that keep them among the slender twigs and leaves. Of this type is the Tennessee. On windy days they are practically safe among the agitated leaves but are betrayed in calm weather by their natural activity. As another type the Black and White may be mentioned. They spend much time about the tree trunks and large limbs and can not be overlooked. A mounted owl would make an excellent decoy.

In number of species the Mniotiltidæ surpass all other families here, and rank second in abundance of individuals. During 1906 I noted thirty species, or six in excess of the Fringillidæ. The following data refer to Ecorse Township, Wayne Co., Michigan, and the summer and autumn of 1906, except where otherwise stated.

Warblers seen in spring but absent in fall were: Blue-winged (*Helminthophila pinus*), Orange-crowned (*Helminthophila celata*), Louisiana Water Thrush (*Seiurus motacilla*), Kentucky (*Geothlypis formosa*), Mourning (*Geothlypis philadelphia*) and Wilson's (*Wilsonia pusilia*) — all the best possible for identification.

In preparing the following list I have included a few birds with haunts so similar to the warblers that they were constantly under notice.

YELLOW-BELLIED FLYCATCHER (*Empidonax flaviventris*).— One-noted Sept. 15. Exceptionally common in September, 1905.

RED-BREASTED NUTHATCH (*Sitta canadensis*).— More common than any other season in my recollection. Absent in autumn of 1905. Secured a male January 11, 1891, which is the only winter record here I am aware of.

RED-EYED VIREO (*Vireo olivaceus*).— Abundant until Sept. 15; then rare and last seen Sept. 30. Common 1905, and the last seen were secured Oct. 12 and 15.

PHILADELPHIA VIREO (*Vireo philadelphicus*).— Absent, but noted in spring of 1906 and Sept. 3, 5, 10 and 24, 1905.

WARBLING VIREO (*Vireo gilvus*).— No autumn records in three years in this portion of Ecorse Twp. Common in spring.

YELLOW-THROATED VIREO (*Vireo flavifrons*).— Common, inclusive of Sept. 5, and last seen on the 7th; most abundant the last week in August.

BLUE-HEADED VIREO (*Vireo solitarius*).— One adult male Oct. 9. First seen in 1905 on Sept. 28 and common that date and on Oct. 5. Last seen Oct. 8 — one specimen.

BLACK AND WHITE WARBLER (*Mniotilta varia*).— Less common than usual; not more than five seen in one day and usually one or two. Only adult male Sept. 15, but adult males are always rare in autumn. October birds have all been adult and junior females.

GOLDEN-WINGED WARBLER (*Helminthophila chrysoptera*).— Last seen August 26, one bird. This was a male but whether adult or junior is uncertain as it was not secured. Last seen August 20, 1905 — a fine adult male.

YELLOW WARBLER (*Dendroica æstiva*).— Last seen August 17 — an adult male. Six noted August 12, appeared to be adult males. Last seen in 1905 August 19. That season I gave the species especial attention and secured questionable birds — all adult males, however, from and inclusive of July 30.

CERULEAN WARBLER (*Dendroica cerulea*). Last seen August 26 — an adult male. Last seen August 24, 1905 — twenty specimens, being adults and juniors of both sexes but mainly the latter.

CHESTNUT-SIDED WARBLER (*Dendroica pensylvanica*).— One specimen Sept. 3 and one Sept. 23 — both junior males. Last seen Sept. 3, 1905 — fifteen noted and all junior birds, the two secured being males.

OVENBIRD (*Seiurus aurocapillus*).— Not taken after Sept. 5 and nothing known as to age and sex of the later birds. Not taken in 1905 though common.

NORTHERN YELLOW-THROAT (*Geothlypis trichas brachidactyla*).— Have taken no adult males after mid-September and the very latest have been junior females.

YELLOW-BREASTED CHAT (*Icteria virens*).— Last seen July 29 — an adult female in Grosse Pointe Township. Undoubtedly occurred later but this was my last visit to that locality. More common in Gratiot Township where at least six pairs nested in 1906.

AMERICAN REDSTART (*Setophaga ruticilla*).— Last seen Oct. 7 — a junior bird. The three noted Sept. 3 were adult males. Last seen in 1905 was an adult male Oct. 5, and in 1904 two adult males Oct. 2. Adult males are not common during September.

NASHVILLE WARBLER (*Helminthophila rubricapilla*).— Five birds were noted, all adults, the Sept. 23 specimen being a female and the remainder males. Absent in autumn of 1905.

TENNESSEE WARBLER (*Helminthophila peregrina*).— The most common species Sept. 5 to 15, and the first in total number of individuals for the season. Met with every day afield until Oct. 19. The Sept. 3 and 5 birds were mainly adults but the junior birds took the lead from Sept. 7 to October. The two Oct. 14 specimens were adult male and junior female. More abundant than in 1905 and absent in 1904.

WESTERN PARULA WARBLER (*Compsothlypis americana ramalinæ*).—

Three birds noted and all adults, the Oct. 7 specimen being a male and the remainder females.

CAPE MAY WARBLER (*Dendroica tigrina*).— All adult birds except two junior females, one secured Sept. 3 and the other Sept. 30. This is the first time I have met with the species here. They ranked seventh in total number of individuals for the season.

BLACK-THROATED BLUE WARBLER (*Dendroica cærulescens*).— First noted Sept 3 — an adult male and female. From Sept. 5 to Oct. 14, both inclusive, there was a mixture of both sexes and ages. The Oct. 23 bird was a junior female. Fourth in total number of individuals for the season.

MYRTLE WARBLER (*Dendroica coronata*).— Not enough taken to judge proportion of age and sex to dates. Second in total number of individuals for the season. Much less abundant than in 1905 and departed earlier. Mr. Edward Arnold informs me he has seen this species in January near Battle Creek, Michigan.

MAGNOLIA WARBLER (*Dendroica maculosa*).— The junior birds first appeared Sept. 3 and the adults on the 15. The three Sept. 30 birds were two adults and one junior — sexes not known. Sixth in total number of individuals for the season.

BAY-BREASTED WARBLER (*Dendroica castanea*).— All junior birds and an equal number of each sex.

BLACK-POLL WARBLER (*Dendroica striata*).— The most common species Sept. 3, and third in total number of individuals for the season. Mixed adults and juniors throughout September. All the October birds were adults, mostly males, but the last specimen was a female. There is no authentic record of this species occurring here in spring but I saw what was probably a small flock May 30, 1905.

BLACKBURNIAN WARBLER (*Dendroica blackburniæ*).— Eight birds noted in all, the only adult being the Oct. 9 bird; this was a male.

BLACK-THROATED GREEN WARBLER (*Dendroica virens*).— First noted Sept. 9, an adult female; then a mixture of both sexes and ages inclusive of Oct. 9. The two of Oct. 14 were adult females and the Oct. 21 bird was not secured. Fifth in total number of individuals for the season.

PALM WARBLER (*Dendroica palmarum*).— One specimen, an adult female Oct. 7.

WATER THRUSH (*Seiurus noveboracensis*).— Birds secured were of both sexes but ages uncertain.

CONNECTICUT WARBLER (*Geothlypis philadelphia*).— The two birds noted were adults. Absent in spring but taken spring and autumn of 1905.

CANADIAN WARBLER (*Wilsonia canadensis*).— One of the August 26 birds was an adult male, the first in autumn for three years.

The following list gives the date of the last summer residents and the number seen; also first and last date, with the number seen of the transient species, together with date of greatest abundance and the number; also everything noted in October. A * indicates that one or more were taken on the date to which it is prefixed.

1906.	July 29	August 17	August 19	August 26	Sept. 3	Sept. 5	Sept. 9	Sept. 15	Sept. 23	Sept. 30	Oct. 7	Oct. 9	Oct. 14	Oct. 19	Oct. 21	Oct. 23	Oct. 28	Oct. 29	Most abundant.	No. Seen.
Nashville Warbler								*1			*1		*1						Sept. 9	*75
Tennessee Warbler					*2						*5	*3	*2							
Western Parula Warbler											*1	*1	*1							*12
Cape May Warbler					*2					*12									Sept. 30	*18
Black-throated Blue Warbler					*2						13	*18	*14			*1			Oct. 9	*75
Myrtle Warbler									*18		*75	20	*50		*15		2	1	Oct. 7	*7
Magnolia Warbler					*1					*3									Sept. 13	*5
Bay-breasted Warbler					*1					*3									Sept. 13	*75
Black-poll Warbler					*75						*3	*4	1	*1					Sept. 3	*4
Blackburnian Warbler				*4								*1							August 26	*15
Black-throated Green Warbler							*1				*5	*4	*2		1				Sept. 23	*1
Palm Warbler											*1								Oct. 7	*4
Water Thrush			1									*3							Sept. 5	*2
Connecticut Warbler						*2													August 26	*2
Canadian Warbler		1	*2								1	1								
Summer Residents																				
Black and White Warbler																				
Golden-winged Warbler				1																
Yellow Warbler		1																		
Cerulean Warbler				1																
Chestnut-sided Warbler									*1											
Ovenbird												1								
Northern Yellow-throat												*2								
Yellow-breasted Chat	*1																			
American Redstart												1								

A NEW AGELAIUS FROM CANADA.

BY HARRY C. OBERHOLSER.

WHEN Mr. Ridgway described his *Agelaius phœniceus fortis*[1] he possessed comparatively few breeding birds from either the United States or Canada. He therefore supposed that the breeding range of his new form was restricted to Canada, and that *Agelaius phœniceus phœniceus* extended westward over the Great Plains of the United States to the base of the Rocky Mountains. Considerable additional material, however, from Texas, Colorado, and British America, shows conclusively that, in the breeding season, *Agelaius p. phœniceus* reaches little, if any, beyond the eastern border of the Great Plains; that *Agelaius p. fortis* occupies the Plains from northwestern Texas to Colorado, Nebraska, and Wyoming; while still another form occurs in the region to the northward. The type of *Agelaius phœniceus fortis*, an autumn female from Omaha, Nebraska, belongs clearly to the southern, paler form; and as the Canadian race is thus without a name, it may be called

Agelaius phœniceus arctolegus subsp. nov.

Chars. subsp.— Similar to *Agelaius phœniceus fortis*, but female decidedly darker below, the streaks more blackish and more extensive, about as broad as the white interspaces; above more blackish. Male with wing and tail averaging shorter; bill larger; and buff of wing-coverts somewhat paler.

Geographical distribution.— Montana, North Dakota, Minnesota, and northern Michigan, north to Keewatin, Athabaska, and Mackenzie; in migration south to Colorado, Texas, Illinois, and probably Ohio.

Description.— Type, adult female, No. 195233, U. S. N. M., Biological Survey Collection; Fort Simpson, Mackenzie, May 26, 1904; Edward A. Preble. Entire upper surface, including wings and tail, clove brown, with narrow marginings of buff or whitish, these most conspicuous on crown, nape, and wings, the back with a few rusty edgings; a rather ill-defined superciliary stripe of buffy whitish mixed with brown; sides of head dull buffy streaked with brown, and with a postocular and a rictal streak of sepia; lores dusky; sides of neck like the nape, but more mixed with whitish; chin salmon pink with a few faint flecks of dusky; throat white, washed with salmon pink, and narrowly streaked with clove brown, broadly so on each side; jugulum and breast white, broadly streaked with

[1] Proc. Wash. Acad. Sci., III, 1901, p. 153.

clove brown, the light and dark colors here being about equal in extent; abdomen and crissum clove brown, all the feathers edged with white; lining of wing sepia brown, the coverts with buffy and whitish edgings.

This new form is much like *Agelaius phœniceus phœniceus* in color, the male in this respect being practically indistinguishable, and the female barely less blackish above and below; but in size *A. p. arctolegus* is much greater, as the subjoined measurements will show. It differs from *Agelaius phœniceus neutralis* in larger size; in more blackish upper parts, broader and darker streaks on the lower surface of the female; and paler buff on the shoulder of the male.

Breeding females from Fort Snelling, Minnesota, near Minneapolis, are rather smaller and occasionally paler below, thus verging toward *Agelaius p. fortis*; but males from the same locality show little or no intergradation. A specimen from Fort Keogh, Montana, taken May 12, 1889, probably represents the summer form of that locality, even though this individual may not have been on its breeding ground. True *Agelaius p. fortis* has not been detected east of the Mississippi River, and all records of this form from the east belong probably under *A. p. arctolegus*. The ranges of these two giant subspecies, in so far as indicated by the specimens at present examined, are as follows:

Agelaius phœniceus arctolegus.

Alberta.— Slave River, 25 miles below Peace River;[1] Outlet of Athabaska Lake;[1] Rocher River, 20 miles above mouth of Peace River.[1]

Keewatin.— Painted Stone Portage, head of Echimamish River (northeast of Norway House);[1] Robinson Portage, Franklin River (east of Painted Stone Portage).[1]

Mackenzie.— Fort Smith;[1] Fort Simpson;[1] Fort Resolution;[1] Big Island, Great Slave Lake;[1] Fort Rae.[1]

Manitoba.— Red River Settlement.[1]

Saskatchewan.— St. Louis.

Colorado.— Semper.

Illinois.— Jacksonville; Bloomington.

Michigan.— Isle Royale;[1] Porcupine Mts., Ontonagon County.[1]

Minnesota.— Fort Snelling.[1]

Montana.— Fort Keogh.

North Dakota.— Pembina.[1]

Texas.— Seguin.

[1] Breeding.

Agelaius phœniceus fortis.

Colorado.— Valmont;[1] Semper; Denver; Golden;[1] Loveland;[1] Pueblo;[1] Estes Park.[1]

Nebraska.— Omaha; Cherry County.[1]

New Mexico.— Aztec.

Texas.— Canadian;[1] El Paso; Lipscomb;[1] Hereford;[1] Cuero.

Wyoming.— Inyankara.

In the present investigation the writer has been much aided by access to the collection of the United States National Museum, through Mr. Ridgway's courtesy; and by the loan of Michigan material, for which thanks are due to the authorities of the University of Michigan Museum at Ann Arbor.

Measurements (in millimeters) of the forms of *Agelaius phœniceus* here concerned are as follows:

Agelaius phœniceus phœniceus.

Sex.	Locality.	Date.	Wing.	Tail.	Exposed culmen.	Depth of bill at base.	Tarsus.
♂	Kershaw Co., S. C.	Feb. 18, 1904	118.	91.5	21.	12.	29.
♂	" "	"	122.	92.5	20.5	11.	28.
♂	Indianapolis, Ind.	Mar. 24, 1877	119.5	91.5	21.5	11.	29.
♂	Wheatland, Ind.	May 20, 1885	117.	84.	23.	12.5	30.
♂	Syracuse, N. Y.	Apr. 2, 1887	117.5	92.	21.5	12.5	30.
♂	Franklin, W. Va.	July 12, 1899	121.	94.	21.	12.5	29.
♂	Mt. Pleasant, Pa.	June 22, 1895	114.	86.5	21.5	11.5	29.5
♂	Cook Co., Ill.	Mar. 23, 1870	118.	90.5	22.	12.	29.
♂	Omaha, Neb.	Mar. 14, 1878	122.	91.5	21.5	12.5	29.
♂	Laurel, Md.	July 7, 1889	119.	91.5	22.5	12.	30.5
	Average of ten males		118.8	90.6	21.6	12.0	29.3
♀	Calais, Me.	May 12 ('69?)	99.	77.	19.	9.5	25.5
♀	Kershaw Co., S. C.	Mar. 7, 1904	102.	78.	17.5	9.5	25.
♀	West Chester, Pa.	Apr. 10, 1883	99.5	72.5	19.	10.	25.
♀	Baltimore, Md.	———	98.	75.	19.	10.5	24.5
♀	Wheatland, Ind.	May 25, 1885	97.5	75.	18.5	10.	25.5
♀	" "	May 14, 1885	99.	72	19.5	10.	26.5
♀	Cook Co., Ill.	Apr. 21, 1870	102.	75.5	19.5	11.	26.5
♀	Washington, D. C.	May 19, 1889	99.	76.5	19.	10.5	26.
♀	Bainbridge, Pa.	———	98.	75.5	17.5	10.5	24.
♀	Allentown, Pa.	May, 1885.	102.	77.5	19.	11.	26.5
	Average of ten females		99.6	75.5	18.8	10.3	25.5

[1] Breeding.

Agelaius phœniceus fortis.

Sex.	Locality.	Date.	Wing.	Tail.	Exposed culmen.	Depth of bill at base.	Tarsus.
♂	Estes Park, Colo.	Aug. 1, 1893	128.	92.5	21.5	12.	30.5
♂	Golden, "	June 19, 1905	128.5	98.	20.5	11.5	29.
♂	Valmont, "	June 15 1905	137.	105.	23.	12.	30.
♂	Pueblo, "	July 31, 1874	128.	99.	22.	12.	30.
♂	Loveland, "	July 19, 1895	127.5	96.	21.5	12.5	32.
♂	Cherry Co., Neb.	June 20, 1889	127.5	95.5	23.	11.5	31.
♂	Hereford, Tex.	July 24, 1901	125.	89.	22.	12.	31.
♂	Canadian, Tex.	July 14, 1903	127.5	98.	23.	12.	32.5
♂	Lipscomb, Tex.	July 5, 1903	132.	97.	24.	11.	29.5
♂	Aztec, New Mex.	Dec. 5, 1893	134	102.	20.5	10.5	31.
♂	Semper, Colo.	Mar. 24, 1890	134.	106.	20.	11.	31.
	Average of eleven males		129.7	98.0	21.9	11.6	30.7
♀	Omaha, Neb.[1]	Mar. 9, 1878	105.5	77.5	18.	11.5	26.5
♀	Semper, Colo.	Dec. 29, 1892	104.5	76.	18.5	11.	26.
♀	Valmont, "	June 16, 1905	102.	74.5	18.	10.5	27.5
♀	Canadian, Tex.	July 14, 1903	104.	75.5	20.5	11.	26.
♀	El Paso, "	Feb. 5, 1892	103.	73.5	18.	10.	25.5
♀	" "	"	102.	73.5	18.	11.	26.5
♀	Lipscomb, "	July 7, 1903	105.	78.	18.5	10.	26.
	Average of seven females		103.7	75.5	18.5	10.7	26.3

Agelaius phœniceus arctolegus.

Sex.	Locality.	Date	Wing.	Tail.	Exposed culmen.	Depth of bill at base.	Tarsus.
♂	Robinson Portage, Kee.	June 27, 1900	127.	94.5	26.	12.5	28.5
♂	— Saskatchewan	———	121.5	93.	26.5	13.	29.5
♂	Rocher River, Alberta	June 5, 1901	122.	88.	24.	13.	32.5
♂	Slave River, "	June 12, 1901	125.5	91.	24.5	12.5	31.
♂	" "	June 12, 1901	124.	91.	23.5	12.5	30.5
♂	Athabaska Lake, "	June 4, 1901	123.5	90.	23.	13.	30.5
♂	Fort Smith, Mackenzie	June 21, 1901	126.5	96.5	25.5	12.	28.5
♂	Fort Simpson, "	May 18, 1904	125.5	91.	23.	13.	29.
♂	Pembina, N. Dak.	June 19, 1873	126.	92.	22.5	12.	30.
♂	Fort Snelling, Minn.	May 28, 1903	126.	91.	22.5	11.5	30.5
♂	" "	Mar. 30, 1903	130.	100.	24.	13.5	29.
♂	Isle Royale, Mich.	Aug. 18, 1905	127.5	92.5	22.5	14.	30.
	Average of twelve males		125.4	92.5	24.0	12.7	30.0

[1] Type.

Agelaius phœniceus arctolegus (continued).

Sex.	Locality.	Date.	Wing.	Tail.	Exposed culmen.	Depth of bill at base.	Tarsus.
♀	Slave River, Alberta	June 12, 1901	102.5	74.5	19.5	11.	26.
♀	Ft. Simpson, Mackenzie[1]	May 26, 1904	104.5	74.	19.	11.	26.
♀	" "	May 27, 1904	101.	73.	18.	10.5	27.5
♀	Seguin, Texas	Nov. 8, 1904	104.5	77.	19.	10.5	28.5
♀	Semper, Colo.	Dec. 29, 1892	103.5	74.5	17.	10.	25.5
♀	Fort Smith, Mackenzie	June 21, 1901	106.	79.	19.5	10.5	26.
♀	Fort Snelling, Minn.	May 28, 1903	97.	72.	17.5	10.	26.
♀	" "	"	101.	78.	18.	8.5	24.5
♀	" "	"	100.	73.5	19.	10.	24.5
♀	" "	"	100.	75.	18.	10.	24.
♀	Isle Royale, Mich.	Aug. 18, 1905	107.	78.	20.	11.	29.
	Average of eleven females		102.5	75.3	18.6	10.3	26.1

[1] Type.

GENERAL NOTES.

The Kittiwake (*Rissa tridactyla*) **on the Coast of Maine in Summer.**— While in Jericho Bay in 1903, my companion, Mr. Fred Rackliff, saw a small gull, with several terns, flying over a tide-rip at the White Horse Ledge. On July 11 I had occasion to go ashore on the ledge and asked him to keep a watch for the strange bird and secure it if possible. On rowing to the same place the bird was found, a shot causing it to go and alight on the Black Horse where it was secured and its identity settled. While it seemed perfectly healthy, it was in worn first winter plumage, and barren. It is preserved in my collection.— ARTHUR H. NORTON, *Portland, Maine.*

The Brown Pelican in Indiana.— A specimen of the Brown Pelican (*Pelecanus fuscus*) was taken by W. S. Dean at Broad Ripple, Marion County, Indiana, on March 28, 1907. Only the one specimen was seen, and it was shot while resting on a rock in White River. This is the first record, as far as I can ascertain, for Indiana. The specimen was secured for the State Museum, of which I am curator.

There is also in the museum a specimen of the White Pelican, taken from the Wabash River near Attica, Indiana, some years ago.— W. S. BLATCHLEY, *Indianapolis, Ind.*

The Whistling Swan in Northeastern Illinois.— While the Whistling Swan (*Olor columbianus*) is considered by no means a rare bird in the Middle West, the actual capture of a specimen is not often recorded. On November 24, 1906, I spent the day four miles north of Waukegan, Ill., where Big Dead River crosses a strip of alternate sand-dunes and marsh a mile wide and a favorite place for ducks when Lake Michigan is too rough for their comfort. I learned, from a hunter, of a swan which had been shot and on my way back to Chicago stopped long enough at Waukegan to secure it. It proved to be an adult male in fine plumage. Length 53 inches, spread 83 inches, weight 30 pounds 8 ounces.

Later I wrote to Mr. H. L. Potter, who shot it, and I quote from his reply as follows: "It was killed at what is known as Farnhams Point in Big Dead River, Nov. 22, 1906. It was a lone bird, and was probably driven in to rest by the heavy wind and storm, which had lasted about three days, as they never stop here except to rest in stormy weather.

"I had shot some ducks which had drifted across and had to pole over on a piece of timber; after securing the ducks I walked up the river some distance to the 'Point' and stepping up behind some bushes to look ahead saw something out on the marsh at one side of the river, but was not sure what it was, although my suspicions were strong enough to cause me to put in a couple of charges of BB shot.

"The swan must have been asleep or dead tired as it never noticed me until I had stepped out from the cover and walked 20 or 25 yards, when all at once it raised up and I killed it the first shot."

Mr. Potter's supposition that it was driven in by stress of weather is borne out by the fact that the swan's stomach was empty. The bird, for a swan, was not over fat, but sufficiently so to test the enthusiasm of any but an old timer.— FRANK S. DAGGETT, *Oak Park, Ill.*

The Glossy Ibis in Central New York.— On May 11 of the present year three Glossy Ibises (*Plegadis autumnalis*) were seen to alight in the Montezuma Marsh at the foot of Cayuga Lake, by Mr. Foster Parker, who shot and preserved two of them. About ten says later he saw three others, flying high over the marsh.

Although the bird is of extremely irregular occurrence in the Middle States, the fact that two separate companies were seen makes it probable that others may have come this way, and it is hoped that this notice will cause any other observers who have been so fortunate as to see the bird to put it on record.— LOUIS AGASSIZ FUERTES, *Ithaca, N. Y.*

Another Specimen of Cory's Bittern.—The University Museum, University of Michigan, has recently secured a specimen of Cory's Bittern (*Ardetta neoxena*), a fact which it seems advisable to record in view of the rareness of the species. This specimen was taken near Toledo, Ohio, on May 25, 1907, by Mr. W. P. Holt. It was found with a large colony of Least Bitterns (*Ardetta exilis*) in the swampy tract of country east of Toledo.

The specimen is an adult male, and is apparently typical of the species. The crown is black, the front of the neck chestnut, and the abdomen, tibia, and sides, smoky brown and chestnut, with a few white, and black feathers. The lesser wing-coverts are black, the median wing-coverts chestnut.

The University Museum is indebted to Mr. W. P. Holt (the collector) for this specimen.— ALEXANDER G. RUTHVEN, *University Museum, University of Michigan.*

The Little Blue Heron in Philadelphia County, Pa., in Spring.— The Little Blue Heron (*Florida cærula*) is of extremely rare occurrence in the vicinity of Philadelphia during the spring, but it was the writer's good fortune to see one of these interesting and fast-disappearing birds on May 11, 1904. It was seen at Holmesburg, Philadelphia County, flying slowly down the Pennypack Creek, above tidewater, toward the Delaware River, up which it evidently had previously ascended. It was a male and flew past within less than thirty feet of me, flying about twenty feet above the water, and was well seen and its identity positively determined.

The Little Blue Heron annually ascends the Delaware River in summer after the nesting season in Virginia and other southern States, often as far as Trenton, but it is of extremely rare occurrence in the spring, as already indicated, so much so, indeed, that I have been unable to find any spring record of it in the Delaware Valley during recent years. The bird seen by me was evidently a straggler from its breeding ground in the South, to which it probably went afterwards, as it was not seen again.— Richard F. Miller, *Philadelphia, Pa.*

A Woodcock Nesting in St. Louis, Missouri.— On April 16, 1907, a workman on the grounds of Washington University, St. Louis, told me he had found the nest of a "Penguin." He had also observed the bird at close range, having lifted it off the nest. I examined the nest and eggshells (for the birds had hatched and left the nest by that date) and found them to be those of a Woodcock. The workman also confessed that I was right when shown a mounted specimen. The remarkable feature of this nest was that it was within fifty yards of a large dormitory in process of construction and in a much frequented part of the grounds. The nest was placed in a large patch of dried weeds and grasses.

Dr. Otto Widmann informs me that he started a Woodcock from his back-yard in a thickly settled portion of the city at noon on May 17th. Woodcock have been reported also from at least one other locality within the city limits.— Roger N. Baldwin, *St. Louis, Mo.*

The Stilt Sandpiper in Massachusetts.— On August 9, 1906, while gunning in Chatham, Mass., I shot a Stilt Sandpiper (*Micropalama himantopus*). It was the only one we saw, and the local gunners said it was the first one that had been seen there for several years.— Chauncey C. Nash, *Boston, Mass.*

The White-rumped Sandpiper in Michigan.— In 'The Auk,' XXIV, p. 140, Messrs. Swales and Taverner practically question my veracity regarding the White-rumped Sandpiper near Port Austin, Huron County, Michigan. Twice, during the last two years, I discussed this sandpiper with Mr. Taverner and on both occasions stated that I could see no reason why we should not meet with it here in Wayne County, as I found it of regular occurrence near Port Austin, and I predicted that some day we would secure specimens here. In view of the fact that this sandpiper was considered very rare in the State, it seems impossible that Mr Taverner could have forgotten the above conversations, yet he says: "Mr. Wood's statement that this species is common in eastern Michigan we received with a good deal of surprise." Later, when my prediction came true, and both Mr. Taverner and myself took specimens, it seems to me that he might have accepted the fulfilment of my prognostication as a verification of my Port Austin observations. I mentioned the results of my Port Austin trips to Mr. Swales and clearly recollect speaking of this sandpiper.

In 'The Auk,' XXIV, p. 97, I illustrate my belief that the taking of a bird with the skin of the abdomen thickened and other indication of having recently bred was not positive proof that it did so in the locality where taken, and in 'The Auk,' XXIV, p. 145, Mr. Taverner considers this an "oblique criticism" of his record of the Savanna Sparrow breeding in St. Clair County ('The Auk,' XXII, p. 89). He is mistaken. I had no means of knowing that he met with the species in considerable numbers together with the above mentioned indications of having bred. It is certain he recorded the species as breeding on no such evidence. Here is his record: "June 18, 1904, near Pearl Beach, St. Clair Co., on the edge of the St. Clair Flats, I found a colony of these birds breeding. About a dozen birds were seen." Not only did he find no nests or young but did not even succeed in collecting an adult bird, according to Mr. Swales. The finding of the species in considerable numbers, etc., were the result of later investigation and have nothing to do with the above record.— J. Claire Wood, *Detroit, Michigan.*

Probable Breeding of the Wandering Tatler in the Interior of Alaska.— While collecting for the U. S. Biological Survey near the upper MacMillan River, Yukon Territory, I secured an immature example of the Wandering Tatler September 5, 1904. It was first observed on some gravel bars near the head of Russell Creek, a small tributary entering the MacMillan from the north near the main forks of the latter. Although apparently a migrating bird, it was so young that it seems probable it was hatched at least somewhere in the interior of northwest America. It was quite able to fly, but the neck and head were still downy.

Further evidence of the breeding of this species has been obtained recently by Charles Sheldon of New York, who spent the summer of 1906 in the Alaskan Range and about Mount McKinley, Alaska. Mr. Sheldon sends me the following extract from his notes taken July 28, 1906, while encamped at the foot of Peters Glacier, Mount McKinley:

"Raining very hard in the morning so we could not pack the horses and start. At 2 P. M., Jack Hayden and I started to climb the ridges and look for my knife which I lost yesterday, evidently while skinning a young marmot. We killed a cony and ground squirrel with the 22-rifle, also a large female marmot. Passing two little lakes buried in the gravel moraine of the Peters Glacier, I saw a pair of sandpipers. They appeared much disturbed. As we went to shoot one, they kept flying about and lighting on willow trees. After repeated shots, Hayden finally killed one. After each shot at the bird as it sat in the tree, it would fly in a short circle and come back and alight on the tree, always near one place. The other kept flying about near. It was clear they had young ones near. A short search failed to reveal them and we had not time to look very long."

The specimen was preserved and proved to be the Wandering Tatler (*Heteractitis incanus*). It is now in the collection of Dr. Leonard Sanford of New Haven.— Wilfred H. Osgood, *U. S. Biological Survey.*

A Correction: Concerning the Occurrence of Numenius borealis on Long Island.— In 'The Auk,' XXI, 1904, p. 289, two specimens of the Eskimo Curlew were erroneously recorded from Long Island. Both were evidently the young of the Hudsonian Curlew (*Numenius hudsonicus*). That reported as in the collection of Mr. Robt. L. Peavey is certainly this species. The bill of this curlew was under 3 inches in length and it was carelessly referred to *borealis*. The elimination of these records apparently shifts the date of the last known occurrence of this species on Long Island to September 26, 1884, when two were killed at The Rockaway by Mr. Newbold T. Lawrence (Auk, II, 1885, p. 273).— WILLIAM C. BRAISLIN M. D., *Brooklyn, N. Y.*

The English Sparrow in Texas.— Prof. Estabrook in his paper on the English Sparrow in the last number of 'The Auk' (April, 1907) states: "The English Sparrow exists in enormous numbers in the whole region east of the Rocky Mountains; with the exception of Florida, where it is found in a few places, and in Texas, Oklahoma, and the northern part of Montana where it is reported absent." With regard to Texas Prof. Estabrook is misinformed, for Merriam and Barrows in their Bulletin on this species mention that it first appeared at Galveston in 1867, at Jefferson in 1882, at Houston in 1884, and at San Saba in 1886. In 1892 Attwater (Auk, IX) wrote "it is unknown as a resident in San Antonio or any of the surrounding country"; and Lloyd in 1887 (Auk, IV) does not mention it from Tom Green and Concho Counties. Finally, Judd and Beal, in 1901, simply say that it is found in certain parts of the State. When I reached Texas in 1903 I found it common in Austin and San Antonio, both near the center of the State, and learned that it had been there for a number of years; in 1904 I found it in Alpine, a small town near the southwestern border of the State, and in the year following at Corpus Christi on the Gulf Coast below Galveston, as well as at Brownsville at the extreme southeastern corner. The facts are that it is now common in all the larger towns of the State, and is so widely distributed and abundant that the farmers are beginning to seek measures to combat it.— THOS. H. MONTGOMERY, JR., *University of Texas, Austin, Texas.*

Lincoln's Sparrow (*Melospiza lincolni*) **at Portland, Maine.**— On June 1, 1907, Mr. Nathan Clifford Brown brought, and donated, to the Society of Natural History a perfectly fresh specimen of Lincoln's Sparrow. It was found dead by Mr. Brown on Congress Street, the principal thoroughfare of Portland.

It was prepared as a skin by the writer, when it was found to have a skull fracture, a little to the left of the median line, extending the length of the brain case, indicating the nature of its death. It is a female, showing some traces of moult, and having one ovarian ovum about as large as a No. 12 shot.

The previous local records seem to have been but three, one being a spring record, May 12, 1900 (Journ. Maine Orn. Soc., VI, p. 55). The other two were Sept. 20, 1896 (Bull. 3, Univ. of Maine), and Sept. 25, 1897 (Journ. Maine Orn. Soc., VI, p. 55).

The present specimen considerably extends the known period of migration.— ARTHUR H. NORTON, *Portland, Me.*

The Prothonotary Warbler in Colorado.— In "May or June, 1900," Mr. B. G. Voigt (deceased) shot a Prothonotary Warbler (*Protonotaria citrea*) between Palmer Lake and Monument, Colo. In "May, 1902" he shot two more specimens of the same species on the Arkansas River about two miles east of Pueblo, Colo. I examined and identified these three birds, and while doing so was struck with the paleness of the bill, corresponding to the fall and winter plumage of this species. I thereupon sent one of the birds to Mr. Ridgway, who writes that there is in the Museum collections a specimen in this plumage which was taken as early as July 28, and who thinks that the dates "May " and "June," as given to me, are certainly erroneous. I cannot vouch for these dates, nor is it possible now to confirm the note which Mr. Voigt gave me shortly before his death. This establishes another new species for Colorado.— A. H. FELGER, *Denver, Colo.*

'Helminthophila lawrencei' near the District of Columbia.— On May 12th the last, I took a warbler of the hybrid '*lawrencei*' type on Plummer Island, Maryland, near the camp of the Washington Biologists' Field Club. It is a high plumaged male, which for convenience may be designated as *lawrencei*, although it evidently differs widely from the type. As no other specimens of *lawrencei* are at hand, I am unable to judge with accuracy how far this differs from previous examples which have been taken. Judging from descriptions and figures, however, it appears to be much more similar to *H. chrysoptera* than most of those that have been recorded under the name *lawrencei*. It is distinctly grayish about the shoulders, sides of neck, and sides of body. The middle of the belly and posterior underparts are creamy yellowish, leaving only the central part of the breast from the black throat posteriorly clear yellow, and even this is of a more subdued greenish tone than in *H. pinus*. The nape, scapulars, and rump, though largely yellowish green, are partly grayish throughout. The chin and the anterior part of the malar stripes are yellowish, and the feathers of the black throat-patch are slightly tipped with yellow. The wing bars are almost as distinct as in *pinus* but their color is yellow as in *chrysoptera* and the secondaries are broadly edged with greenish. The crown is yellow becoming greenish posteriorly. The only whitish markings are the posterior half of the malar stripe and a short stripe behind the upper border of the eye corresponding to the superciliary stripe which in *chrysoptera* extends nearly or quite to the base of the bill. The lores and auriculars are black, practically as in *chrysoptera*.

Whether or not any special significance attaches to the taking of this bird is problematical. Since *chrysoptera* and *pinus* are known to be hybridizing rather freely in certain parts of their breeding range, it is not strange that specimens of the hybrid type should be forthcoming from a locality in their migration route. Doubtless, it is only because actual collecting has become so limited in the eastern United States, that more specimens of this sort have not been recorded.— WILFRID H. OSGOOD, *U. S. Biological Survey.*

Capture of Lawrence's Warbler on Staten Island, N. Y.— At Richmond, Staten Island, N. Y., on May 11, 1907, I found a Lawrence's Warbler (*Helminthophila lawrencei*) on some dead bushes out in a dry field. Its black throat and cheeks, sharply contrasted with the rich yellow of its breast and crown, rendered it particularly conspicuous among the other warblers present. Fortunately I was able to verify my observation by shooting the bird, which proved to be a male, of typical color, with two white bars on each wing, washed with yellow, and somewhat wider and more confluent than is usual with the Blue-winged Warbler.— JAMES CHAPIN, *New Brighton, N. Y.*

The Breeding of Brewster's Warbler near Boston.— On May 19, 1907, in the Arnold Arboretum, near Boston, Mass., I heard a bird song which I supposed at first was that of a Golden-winged Warbler. Upon investigation, I found the bird on a low birch tree, feeding and singing by turns. To my surprise, though, it had the broad yellow wing-bars, bluish gray back, and yellow crown which I had expected to see, there was only a narrow black line through the eye, and an entire absence of black on the cheeks and throat, the entire under parts being silky pearl-white. Though I was entirely unfamiliar with Brewster's Warbler in life, I had seen stuffed specimens and had read with much interest the latter-day discussions of its relation to Golden-winged and Blue-winged Warblers. A few days later I was allowed to see, through the kindness of Mr. Walter Deane, Mr. Brewster's specimens of all three species, *Helminthophila pinus*, *Helminthopila chrysoptera*, and *Helminthophila leucobronchialis*, among which was the type specimen of *leucobronchialis* taken by Mr. Brewster in Newtonville, Mass., on May 18, 1870. The resemblance between the type specimen and the bird in the Arboretum, as I remembered it, was absolute, except that there was a very slight wash of yellow on the breast of the type specimen which I had not observed on the living bird. Interest in the Arboretum bird quickly spread and it was soon seen by many other observers, all of whom agreed that it was a Brewster's Warbler; the first record for Massachusetts, I understand, since the taking of the type specimen thirty-seven years ago. On June 8, a thorough search of the vicinity was made by several of our more expert local ornithologists, and the female, nest, and five eggs were discovered, the nest being located, I believe, by Mr. C. J. Maynard. The nest is on the ground, at the foot of a tiny elm

tree situated among other low trees and shrubs, and is within six or seven feet of the main driveway through the Arboretum. Across the driveway at this point is a spring and the beginnings of a small brook. In the structure of the nest are interwoven brown leaves with upturned stems, after the fashion of the Blue-winged Warblers as stated in Mr. Chapman's 'Handbook of the Birds of Eastern North America.'

A number of interesting circumstances are to be noted: first, the female has blackish areas on the throat and cheeks, shaped like those on a Golden-wing, but has also a still blacker, narrow line extending through the eye; second, a pair of Golden-winged Warblers has been known to breed in the Arboretum, in the immediate vicinity of the present nest, for a number of years; third, this year the Golden-wings seem to be absent.

Of course the most intense interest centers in the expected young, and it is to be fervently hoped that so accident will befall to prevent the successful hatching of the eggs and rearing of the young birds.— HELEN GRANGER, *Cambridge, Mass.*

Ten Birds New to the Avifauna of Kansas.— Through the kindness of my friend Dr. R. Matthews of Wichita, Kansas, I have received for the Museum of the University of Kansas a mounted adult male specimen of the Black-necked Stilt (*Himantopus mexicanus*). This specimen was shot ten miles south of Wichita in 1906 by Mr. T. H. Griffith.

Dr. Matthews has also presented to the University Museum a specimen of the Red-breasted Merganser (*Merganser serrator*), which was shot in November, 1906, by Mr. Dan Breese on his lake near Colwich, Sedgwick Co., Kansas. This species was included in the early editions of my Catalogue of the Birds of Kansas on the authority of Professor S. F. Baird, but was omitted from the fifth edition, which contained only those species which were personally known to me as occurring in Kansas.

I desire also to note the capture on the Kansas–Colorado line in the spring of 1905, by Mr. Edward R. Warren, of the eight following species new to the Kansas list: The Scaled Partridge (*Callipepla squamata*); the Spurred Towhee (*Pipilo maculatus megalonyx*); the Green-tailed Towhee (*Pipilo chlorurus*); Swainson's Vireo (*Vireo gilvus swainsoni*); Virginia's Warbler (*Helminthophila virginiæ*); Macgillivray's Warbler (*Geothlypis macgillivrayi*); the Sage Thrasher (*Oroscoptes montanus*); and the Dwarf Hermit Thrush (*Hylocichla aonalaschkæ*).

The above ten species, together with the seven species previously reported to 'The Auk,' in addition to the 342 species enumerated in the fifth edition of my Catalogue of the Birds of Kansas, make a total of 359 species whose actual capture in Kansas has been verified by me.— J. H. SNOW, *University of Kansas, Lawrence.*

A Kentucky Warbler near Boston, Massachusetts.— At Wellesley Hills, in the forenoon of May 14, 1907, having just left the electric car and passed in the rear of the stores and dwellings which front on the little village

square, I came to a swampy hollow with some depth of standing water almost surrounded by large willows and with small willows and other brush growth rising out of the water. Here clearly distinguished from familiar warbler songs which at once reached my ear from Parula, Myrtle and Yellow Warblers, Redstart and Northern Water-Thrush was heard a clear, bright, rather loud song in dissyllabic rhythm which I had never heard before. Before coming in sight of the bird which gave it, it was my happy experience to realize that I was looking upon and hearing the song of a Kentucky Warbler (*Oporornis formosa*). The song was many times given at intervals during the half-hour which I remained. There were generally five repetitions of the dissyllable without notes of introduction or finish. It might be put into the word, *wheeter-wheeter-wheeter-wheeter wheeter*, as Mr. Allison suggests in Mr. Chapman's 'Warblers of North America,' or other dissyllables such as others suggest therein, or into the words, *cherry-cherry-cherry-cherry-cherry*, rapidly repeated, as it came to my ear. The fulness and brightness of tone were like the Mourning Warbler's *cheery* song, which, however, is given with more fulness and deliberation and with three repetitions of *cheery* only. Under my observation the Kentucky Warbler moved back and forth in a quite limited area, often about the roots and stems of the bushes just above the water, a very beautifully plumaged bird. Mr. Bradford Torrey's expressions of admiration for the simplicity and richness and good taste of its costume seemed none too enthusiastic.

Passing on from this point the first Blackburnian and Black-throated Blue Warblers of the season were noted, the first Yellow-throated, Blue-headed and Red-eyed Vireos were seen, and the Prairie and Golden-winged Warblers were found in their breeding haunts. The morning of May 14 had opened with light southwest winds and a temperature of 56°, which had been carried in the middle of the forenoon to 78°. It was under these conditions that I found the Kentucky Warbler active and freely singing. Presently a sudden change was inaugurated in five minutes' time, the wind came fresh from the east, and the temperature dropped 20°. This had a quieting effect upon all of the birds, and when I passed on the Kentucky was no longer singing. At four o'clock in the afternoon I returned to this same spot and could not see or hear anything of him. So it was again the next forenoon when I sought him. The other birds of the day before were there, but he was not.

Messrs. Howe and Allen in 'The Birds of Massachusetts,' 1901, do not include the Kentucky Warbler in their list, but in a note make reference to a bird of this species being included in Dr. Holder's 'List of the Birds of Lynn,' 1846, as then in the collection of the Lynn Natural History Society, adding, "as we have been unable to see this specimen we make but this mention of it." Dr. Charles W. Townsend in 'The Birds of Essex County,' 1905, does not include this species in his list, remarking, "Dr. Holder includes this bird in his Lynn list, 1846, stating that there is a specimen in the

collection of the Lynn Natural History Society. As there is no other record of this bird for the State, and as I was unable to find this specimen in a recent examination of the battered remains of this collection, I have omitted the bird from the list."

This Kentucky Warbler at Wellesley Hills would seem, therefore, to be the first authentic record of the species within the State.

In 'A Review of the Birds of Connecticut' by Mr. C. Hart Merriam, 1877, two records of Kentucky Warbler within that State are given, namely: "Mr. Erwin I. Shores obtained a male of this species at Suffield, Conn., Aug. 16, 1876, thus adding another bird, not only to the Avifauna of Connecticut, but also to New England"; and "I learn from Mr. J. G. Ely of Lyme, Conn., that he has shot one Kentucky Warbler." Dr. Jonathan Dwight, Jr., in 'The Auk,' Vol. XX, October, 1903, under the heading, 'Some New Records for Nova Scotia,' based on a small lot of bird skins sent to him from Sable Island by Mr. Jas. McL. Boutcher, furnishes this note on Kentucky Warbler: "A young male taken September 1, 1902, is in first winter plumage as determined by softening the skin and examining the bones. The nearest point at which the species regularly breeds is New Jersey."— HORACE W. WRIGHT, *Boston, Mass.*

Many Eyes are Better than One Pair.— Ornithologists from all over the United States and Canada are sending each year to the Bureau of Biological Survey their observations on the arrival of the birds. Some of these reports are merely incidental notes taken while performing the daily routine tasks; others represent a large amount of time and frequent special trips taken to fields and woods. The question continually arises, How nearly do the better grade of these reports represent the actual date of the earliest arrivals? If more time was spent in the fields by the observer, or if several persons worked carefully and completely a limited locality, how much earlier would be the dates of arrival? To find an answer to these questions was the problem before me the past spring. I began my excursions with the opening of the season, and as spring advanced, my trips became more frequent until during the three weeks of the height of migration they were almost daily. They were extended in all directions around Washington and were planned to cover the various kinds of country. As a result I saw more different species of birds than during any previous spring, including several of the rarest birds of this region.

The Audubon Society of the District of Columbia is in a flourishing condition. It holds several field meetings each year; the members have had access to a good selection of skins of local species and many of the members have become well acquainted with the avifauna of the District. In addition to the regular field days of the Society, this spring several of the more expert bird observers made many extra trips into the woods, and some of the most enthusiastic spent a large part of their time in hunting for new arrivals. These all reported to me the new birds they saw

from day to day, and I also received the notes collected by the various members of the Biological Survey and the National Museum in their excursions around the city. Many of the notes were duplicates or of no value, but after all these had been eliminated it was found that usable records had been received from twenty-three persons. The question then is how much additional did the twenty-three pairs of eyes observe that had not been noted by me. The following is a condensed answer.

Seen by others and not by me	4 species
Seen by me and not reported by others	3 "
Seen by others before I saw them	44 "
Seen by me before reported by others	25 "
Seen by both on the same day	7 "
Total	83 species

The comparison applies only to the migrant land birds, as the facilities for observing water birds in the district are too limited to make the records of any value.

When using migration records for the calculation of average dates of arrival, I usually discard dates that are more than six days later than the probable normal date of arrival. When this test is applied to the notes the following results are obtained

Seen by others within six days of normal, but not by me	12 species
Seen by me within six days of normal but not reported by others	11 "
Seen by both within six days of normal	46 "
Reported by no one within six days of normal	14 "
Total,	83 species

This last item of fourteen species not recorded within six days of normal is probably higher than would be obtained during most years. The month of April, 1907, in Washington was the coldest for thirty-five years, and many species were retarded in their movements. As the record stands in this unfavorable season I obtained usable notes on 71 per cent. of the species seen, while by adding the notes of the other observers, this is raised to 84 per cent. Of the 79 species seen by me, 57 were noted within six days of the normal time of arrival, which number is raised to 69 species on the addition of the remainder of the records.

The most interesting part of the investigation is the question of how much earlier twenty-four pairs of eyes can see birds than one pair. In spite of all my efforts, the larger amount of time spent in the field and the great variety of country covered, more than half the species were reported to me by others before I had noted their arrival.

Yet I saw them soon afterward and the 25 species that I saw first are a partial offset. The net result is that the combined notes average 1.3 days earlier than my notes alone. Hence, judging by the results of this single

year's trial, the dates of arrival obtained by a single person are on the average a little more than a day later than the time the birds actually did arrive.— WELLS W. COOKE, *Biological Survey, Washington, D. C.*

Some Interesting Records from southern Missouri.— Helminthophila bachmani. BACHMAN'S WARBLER.— I was fortunate enough to find this interesting warbler on two different occasions, the first on May 2, 1907, in the northwestern part of Shannon County, and the second on May 23, 1907, in Carter County, near Grandin. Both of these records were surprising considering the character of the country, for these counties lie on the southeastern slope of the Ozark Mountains, a dry rocky region of limestone formation covered with a forest of oak and yellow pine (*Pinus echinata*), and not at all like the swampy cypress swamps of Dunklin County in the Missouri Peninsula where Mr. O. Widmann found them in 1897 (Auk, XIV, p. 305).

Helminthophila leucobronchialis. BREWSTER'S WARBLER.— On May 12th, 1907, in Shannon County, Mo., my attention was attracted by a warbler song which I did not recognize. I soon discovered the bird and on securing it found it to be an absolutely typical specimen of Brewster's Warbler (No. 1531, ♂, Coll. L. B. & E. S. Woodruff). The entire under parts are pure white without even a suggestion of any yellow wash. The entire back and neck, from crown down, bluish gray with only a few feathers in the middle of the back slightly tipped with greenish, not nearly so much as usually found in *H. chrysoptera*. On the wings is a single broad patch of canary yellow. In fact this specimen, except for the absence of the black throat and cheek patch, would be a typical *H. chrysoptera*, and the only similarity to *H. pinus* is the narrow black line through the eye. There is nothing about this specimen to substantiate the theory that Brewster's Warbler may be a color phase of *H. pinus*. The song, though similar in character to that of *H. pinus*, was much weaker and more varied.

This makes the first record for Missouri and for any State west of the Mississippi River.

Helminthophila peregrina. TENNESSEE WARBLER.— On May 2, 1907, I secured a male Tennessee Warbler in Shannon County, Mo., which had a number of coppery chestnut feathers in its crown, similar to those of a Nashville Warbler. In all other respects it was a typical Tennessee Warbler. (No. 1500, ♂, Coll. of L. B. & E. S. Woodruff.)

Dendroica vigorsii. PINE WARBLER.— This warbler has not been heretofore recorded as breeding in Missouri but I found it common in the pine woods of both Shannon and Carter Counties from March 8 till I left on June 8. Though I found no nests, I saw the birds gathering nesting material and carrying it up into pines in the latter part of March, and on April 25, I secured a nestling too young to fly which had fallen from its nest and was being fed on the ground by its parents. I also found a number of full grown young birds in the first plumage before the middle of May.

Dryobates borealis. Red-cockaded Woodpecker.— This woodpecker is also a bird which has not been recorded as breeding in Missouri. Unfortunately I found no nests but of its breeding there there can be no question for I found it fairly common in Shannon County and in those portions of Carter County where the pine has not yet been lumbered from early in March till the middle of June. On May 12, 1907, I secured a male in Shannon County, whose breast and belly showed that he had been sharing with his mate in the duties of incubation.

Empidonax traillii alnorum. Traill's Flycatcher.— This flycatcher, though recorded from the Mississippi Valley both north and south of Missouri, has not previously been found in Missouri. On June 3, 1907, I saw a pair of these birds near Grandin, Carter County, Mo., and secured the female. Dr. J. A. Allen confirmed my identification of this species.

Loxia leucoptera. White-winged Crossbill.— On April 18, 1907, I secured a female White-winged Crossbill which was feeding in company with two female American Crossbills in the top of a fallen yellow pine. This makes the first record for Missouri.

Peucæa æstivalis bachmanii. Bachman's Sparrow.— This bird also has not been heretofore recorded as breeding in Missouri, but I found it common throughout the virgin mixed pine and oak forests of Shannon County from April 6 till I left on May 15 for Grandin, Carter County. In Carter County the pine had been mostly cut off and the Bachman's Sparrow was rather rare, but on May 27, 1907, I secured a nest containing two eggs of Bachman's Sparrow and three eggs of the Cowbird, all with incubation far advanced.

Sitta pusilla. Brown-headed Nuthatch.— Though I found no proof of the breeding of the Brown-headed Nuthatch in Missouri, the probabilities are strongly in favor of it. On March 19, 1907, I secured a pair of these birds together in some yellow pines on the edge of a small clearing in Shannon County. The female was flying back and forth to an old dead pine and seemed to be much disturbed after I had secured the male.— E. Seymour Woodruff, *New York, N. Y.*

Audubon's Ornithological Biography.— In the January 'Auk' (XXIV, p. 111) Mr. Ruthven Deane, of Chicago, speaks of a copy of Vol. I, of Audubon's Ornithological Biography, bearing the imprint, "Philadelphia: Judah Dobson, Agent, 108 Chestnut Street; and H. H. Porter, Literary Rooms, 121 Chestnut Street, MDCCCXXXI"; and says that after careful search he has only recently found a similar copy.

I beg to say that in the library of the Academy of Natural Sciences, (Philadelphia) the first volume has the same imprint. The other four volumes have, each, the imprint, "Edinburgh, Adam & Charles Black," with the years 1834, 1835, 1838, and 1839, respectively. All but Volume II were presented to the Academy by the author. My own Volume II bears the imprint "Boston, Hilliard, Gray & Company, 1835."

I have two duplicates of volume III, Adam & Charles Black, which I would sell or exchange for Volumes I and IV.— Nath. E. Janney, *Philadelphia, Pa.*

RECENT LITERATURE.

Salvin and Godman's 'Biologia Centrali-Americana.— Aves.'— This great work on the birds of Middle America,[1] which was completed some little time ago, forms four quarto volumes, three of text, aggregating 1680 pages, and one of 84 hand-colored plates. The publication was begun in 1879 and completed in 1904, having been much delayed by Mr. Salvin's long-continued ill-health and sudden death in 1898, the third volume of the text being completed by Mr. Godman, with the assistance of Dr. R. Bowdler Sharpe and Mr. Ogilvie-Grant.

The region embraced in this work includes Mexico (except Lower California), and Central America south to a little beyond the political boundary of Panama, and the adjacent islands. "The 1413 species of birds.... embrace representatives of 78 families and 539 genera." Of the genera, 38 are endemic, as are also 636 of the species. "Of these latter, 271 are peculiar to (*a*) Mexico, Hondurus, or Guatemala, 3 to (*b*) Nicaragua, and 161 to (*c*) Costa Rica or Panama, the remainder (189) being more widely distributed within the region or common to two of these divisions." In comparison with other tropical regions, India has 1626 species against 1413 for Middle America, but the Indian region is twice larger in area, "so that the balance of numbers is considerably in favor of Central America."[2]

The material for this work was mainly obtained by the authors on their several visits to Central America and Mexico in 1857–58, 1861–63, 1867, 1873–74, and 1887–88. In addition to their own field explorations, they employed several skilled collectors for a number of years, who made large collections in various parts of Mexico, Guatemala, Costa Rica and Panama. As the various parts of the work were completed the authors presented their material to the National Museum at South Kensington, amounting in the aggregate to "about 85,000 specimens."

The 'Biologia Centrali-Americana' was an enormous undertaking, its scope comprising the fauna and flora of an immense region. Its publication, begun nearly thirty years ago, has proceeded with reasonable rapidity, till now only a few of the forty or more volumes — those relating to fishes and certain groups of Cœlenterates — remaining unfinished. It has, quite naturally, greatly exceeded the estimate given in the early pros-

[1] Biologia | Centrali-Americana. | — | Aves. | Vol. I [–III] | (Text.) [Vol. IV. Plates.] | By | Osbert Salvin, F. R. S., &c., | and | Frederick DuCane Godman, D. C. L., F. R. S., &c. | 1879–1904.— 4 vols. 4to, 3 of text and 1 of plates.

Vol. I, pp. i–xliv, November, 1904; pp. 1–512, pll. col. i–xxxv + xv*a*, September, 1879–April, 1887. Vol. II, pp. i–iv, 1–598, pll. xxxvi–lx + liv*a*, lviii*a*, lviii*b*, lix*a*, December, 1888–February, 1897. Vol. III, pp. i–iv, 1–510, pll. lxi–lxxix, November, 1897–April, 1904. Vol. IV, pp. i–viii, with plates as per collation above.

[2] Introduction, by Mr. Godman, pp. vi–viii.

pectuses, it comprising some 20,000 pages of text, and about 1500 plates, many of them colored. The different parts having been prepared by eminent specialists, it is in the highest degree authoritative, and forms an enduring monument to the enterprise, ability, and persistence of its editors and projectors, Messrs. F. DuCane Godman and Osbert Salvin. As a notice of the general scope and plan of the work has already been given in this journal,[1] and also an extended review of Volume I of the 'Aves,'[2] it remains to notice here the concluding bird volumes.

Mr. Robert Ridgway, in reviewing the first volume of the 'Aves' (*l. c.*), said of it: "Volume I. . . . includes the whole of the Oscines, and is the only single and approximately complete work in existence [in 1890] on the special subject to which it pertains. The high reputation of the authors is of itself a sufficient guarantee that their task has been intelligently and thoroughly performed, and has resulted in a grand work which is absolutely indispensable to students of New World ornithology, highly useful to those who labor in other geographical fields, and must long remain the standard authority on the birds of Central America." This high praise applies in equal force to the succeeding volumes, as do also Mr. Ridgway's criticisms of some of its defects. Thus, he says: "As was to be expected from the character of their previous writings on the same subject, the authors of the 'Biologia' treat their subject from the conservative standpoint to which English naturalists, for the most part, still adhere; and it is the natural sequence of this method, but more especially the unfortunate adoption of the purely binomial system of nomenclature which affords most of the grounds for criticism; the very great importance of the work rendering such defects highly conspicuous." In other words, when the binomial system is strictly followed, it inevitably leads to inconsistent rulings in regard to the status of forms commonly recognized as subspecies, some being given full specific rank and others, equally entitled to recognition, being reduced to synonyms.

Volume II includes the suborders Oligomyodæ and Tracheophonæ of the Passeres, the Macrochires, Cypseli, Caprimulgi, Pici, Coccyges, and Psittaci; Vol. III, the Striges, Accipitres, Steganopodes, Herodiones, Phœnicopteri, Anseres, Columbæ, Gallinæ, Geranomorphæ, Limicolæ, Gaviæ, Tubinares, Pygopodes, Alcæ, and Crypturi; Vol. IV consists of 84 hand-colored plates, representing 150 previously unfigured birds, drawn by J. G. Keulemans, with the explanatory 'List of the Plates.'

The classification adopted is that of Sclater and Salvin's 'Nomenclator Avium Neotropicalium,' published in 1873. In the matter of nomenclature, the 1766 edition of Linnæus's 'Systema Naturæ' is taken as the date of departure, and the binomial system is strictly adhered to throughout, subspecies, as such, not being recognized, with, as already noted, many

[1] Bull. Nuttall Orn. Club, VI, 1881, pp. 174, 175.
[2] Auk, VII, 1890, pp. 189–195, by R. Ridgway.

inconsistent rulings as to forms admitted or rejected. It is to be remembered, however, that the work was begun before subspecies had obtained general recognition, and before the 1758 edition of Linnæus had come to be so generally recognized as the proper date for the beginning of zoölogical nomenclature.

The method of treatment is briefly as follows: The principal bibliographical references and synonymy are cited for the species and genera; the distinctive characteristics of the genera are given, with a general statement respecting the number and distribution of the species; a Latin diagnosis or description is given of each species, followed by a brief statement of its distribution, and remarks on the general history of the species, its affinities and distinctive features, its geographical distribution, and often more or less is said about its haunts and habits, based largely on original field observations. The 'Introduction' (Vol. I, pp. v–xliv) gives a general history of the work; the limits of the region treated; the material on which the work is based and how and where it was collected; the faunal relations and characteristics of the region; a list of Mr. Salvin's more important papers on the birds of Central America; and tables of distribution for the families and species of the birds of Mexico and Central America (pp. xi–xxxvii).

While later works on the avifauna of the region here treated may supercede the 'Aves' of the 'Biologia,' from the points of view of nomenclature and classification, it will ever remain a classic in the ornithological literature of 'Middle America,' and an enduring monument to its authors.—J. A. A.

Proceedings of the Fourth International Ornithological Congress.[1]—The Proceedings of the Fourth International Congress, held in London, June, 1905, forms a volume of nearly 700 pages, illustrated with eighteen plates, seven of them colored. A 'Record of Proceedings,' occupying pp. 9–89, is followed by the President's Address, by Dr. R. Bowdler Sharpe, and thirty-eight papers read before the Congress. The 'Record of Proceedings' is not only a record of the meetings and excursions, but includes a summary of the discussions on the papers read.

The President's address (pp. 90–143) is an account of the origin and history of the Bird Collection in the British Museum. This is followed by a paper on 'What constitutes a Museum Collection of Birds?' (pp. 144–156), by Frank M. Chapman. This is practically an account of the orni-

[1] Proceedings | of the | Fourth International | Ornithological Congress | London June, 1905 | forming | Volume XIV of the "Ornis" | Edited | under the direction of the President: | R. Bowdler Sharpe, LL. D., | by | The Secretaries: | Ernest J. O. Hartert, Ph.D., and J. Lewis Bonhote, M. A. | With Eighteen Plates. | London: | Dulau & Co., | 37, Soho Square, W. | February, 1907. Large 8vo, pp. 1–696, pll. i–xviii, 7 colored. February, 1907.

thological department of the American Museum of Natural History. Several full-page half-tones illustrate the method of storage of the research collections, several of the larger bird groups, and one of the Museum's travelling 'School Collections.'

Little more can be given in this connection than the titles of the papers, which indicate the varied character of the subjects brought before the Congress, as follows: 'The Ornithological Correspondence of the late Professor Johann Friedrich Naumann, by Paul Leverkühn; 'On the Migration of Birds,' by Otto Herman; 'Sur un atlas des Planches coloriées de l' Ornithologie de Brisson attribué au peintre Martinet, provenant de la vente Alph. Milne-Edwards,' by Dr. Louis Bureau, followed by remarks by Alfred Newton; 'The First Bird List of Eber and Peucer (1549), and its Relation to the "Avium. . . . Historia" of William Turner (1544),' by Henry Scherren; 'On Extinct and Vanishing Birds,' by Hon. Walter Rothschild (with 2 colored plates); 'Kaiseradler und Aasgeier am Horst,' by Paul Leverkühn; 'On some Antarctic Birds,' by Edward A. Wilson; 'Some Notes on the Hybridizing of Ducks,' by J. Lewis Bonhote (with 4 colored plates); 'The principal aims of Modern Ornithology,' by Ernest Hartert; "Some ornithological results of the Scottish National Antarctic Expedition,' by W. S. Bruce; 'Vortheile und Nachtheile moderner Arten- und Unterartenbeschreibung und Namengebung,' by Rudolf Blasius; 'Monographie de la Sterne de Dougall (*Sterna dougalli*),' by Dr. Louis Bureau (with map); 'Descriptions of new species and conspecies of Neotropical Birds,' by Hans Graf von Berlepsch (see below, p. 361); 'On the genus *Elænia* Sundev.,' by Hans Graf von Berlepsch (see below, p. 362); 'On the Birds of Madeira,' by Ernesto Schmitz; 'On the origin of the differences between Nestling Birds,' by W. P. Pycraft; 'Schlussstein zur Litteratur über *Erithacus cairii*,' by Hans Freiherr von Berlepsch, 'Studien über Tyranniden,' by Hans Graf von Berlepsch (see below, p. 362); 'La Perdrix grise des Pyrénées,' by Louis Bureau; 'Sequence in Moults and Plumages, with an explanation of Plumage-Cycles,' by Jonathan Dwight, Jr.; 'Remarques au sujet de certains oiseaux méconnus,' by Alphonse Dubois; 'On Variations in the Colouring of *Colymbus cristatus*, *C. griseigena*, and *C. nigricollis*, observed at the Lake of Velencze, in Hungary,' by Steven Chernel de Chernelháza; 'The Unusual Migration of Brünnich's Murre (*Uria lomvia*) in Eastern North America,' by J. H. Fleming (see below, p. 359); 'Neuere Beobachtungen über den Herbstzug des Stares (*Sturnus vulgaris*),' by F. Helm; 'Die Pyrenäen und ihre Vogelwelt,' by R. Blasius; 'On Colour Variation in the Eggs of Palæarctic Birds,' by F. C. R. Jourdain; 'The Wild Birds Protection Acts as administered by Orders in Great Britain and Ireland,' by Sir Digby Pigot; 'Bird Legislation in Australia,' by Sir John Cockburn; 'The Rationale of Bird Protection,' by Frank E. Lemon; 'The Food of Birds,' by Otto Herman; 'Ornithologie économique. A propos d' études sur le Régime alimentaire des Oiseaux,' by Dr. Quinet; 'Note sur le Freux (*Corvus frugilegus* L.)

et son utilité au point de vue de l' Agriculture et de la Sylviculture,' by Fd. Visart de Bocarmé; 'The Sparrow! Is it useful or harmful to Agriculture?' by Igali Svetozár; 'Étude sur la grosseur des grêlons dangereux pour les Oiseaux,' by Paul Martin; 'Notice sur l'opportunité de protéger la becasse au printemps,' by Louis Ternier; 'The Importance of Aviculture as an Aid to the Study of Ornithology,' by D. Seth-Smith.

In the account of the meeting held at Cambridge is an interesting list of books, letters, papers, and drawings exhibited in the Philosophical Library, with notes thereon by Professor Newton.— J. A. A.

Newton's 'Ootheca Wolleyana.'— The fourth and concluding part[1] of the 'Ootheca' comprises lots 4841–5918, in sequence, with Nos. 5919–6076 in a 'Supplement' of 'Corrections, Omissions, and Additions.' The nature of the work and the admirable manner of treatment having been previously stated,[2] it remains to record its completion and to note the matter in the 'Appendix,' which consist of a reprint of all the natural history publications of John Wolley, in chronological sequence, except the large amount of ornithological matter given *passim* in the 'Ootheca.' These papers are 56 in number, of which 14 relate to mammals, 26 to birds, 10 to reptiles and amphibians, 9 to insects, and 2 to 'miscellaneous,' and bear dates, 1845–1859.

Says the editor, in a 'Retrospective Note': "Thankful as I am at being able to complete this work, my feeling is rather of regret than satisfaction, for, owing to the length of time which has elapsed since the first part of it appeared, so few of Mr. Wolley's personal friends are left to see its conclusion, and this Catalogue is largely a record of ancient friendships. My only consolation is that the protracted delay has not been my own fault, as I can honestly say that whenever the cessation of more important duties gave me opportunity I resumed my labor of love, but again and again months — not to say, years — passed without such opportunity recurring. Furthermore, I may repeat, as I pointed out in the Introduction (Vol. I, p. iii), that the delay has not been without its advantages, by enabling me to make considerable additions to the Collection of great value and interest — many of them specimens wholly unattainable in

[1] Ootheca Wolleyana: | An illustrated Catalogue | of | the Collection of Birds' Eggs | formed by the late John Wolley, Jun., M. A., F. Z. S. | Edited from the original notes | by | Alfred Newton. | — | Part IV. Alcæ–Anseres: | with Supplement and Appendix, | — | London: | R. H. Porter, 7 Prince's Street, Cavendish Square. | M. CM. VII. | [Price £1 5s. net.] — 8vo, pp. i–iv, 385–665 + 1–96, i–vi, 3 pll. and map.

Title-page of the completed Volume II: Ootheca Wolleyana: | An illustrated Catalogue | of | the Collection of Birds' Eggs,' | begun by the late | John Wolley, Jun., M. A., F. Z. S., | and continued with additions | by the Editor | Alfred Newton. | — | Vol. II. | — | London: | M. CM. V.–M. CM. VII. | [Sold by R. H. Porter, 7 Prince's Street, Cavendish Square.]

[2] For notice of Part III, see Auk, XXIII, Jan., 1906, p. 118.

Mr. Wolley's lifetime and for long after his death. . . . Lastly, I have to state that the Collection of which this is the Catalogue has been given to the University of Cambridge, in whose Museum of Zoölogy I trust it may long continue."

The frontispiece gives a view of Muoniovara, Mr. Wolley's headquarters in Lapland, from a pencil drawing by Mr. Wolley made in the autumn of 1853. A map of part of Lapland illustrates the ornithological journeys of Mr. Wolley in 1853–1857. The 'Catalogue,' it is almost needless to say, is a mine of previously unpublished first-hand information respecting the breeding haunts and habits of many northern-breeding water-fowl and other species; while the extended editorial additions and comment greatly increase the interest and value of the work.[1] — J. A. A.

Mershon's 'The Passenger Pigeon.'[2] — In compiling his book on the Passenger Pigeon Mr. Mershon has done good service. Its contents is varied and of unequal value, but as a whole it is a convenient and valuable record of the former almost incredible abundance of a now nearly extinct species. Much of the material here brought together has never before been published, and much of the remainder is from such scattered sources that it is a great convenience to have it thus brought together in a single handy volume. The author modestly disclaims any previous literary training, and says: "I am merely a business man who is interested in the Passenger Pigeon because he loves the outdoors and its wild things, and sincerely regrets the cruel extinction of one of the most interesting natural phenomena of his own country. If I have been able to make a compilation that otherwise would not have been available for the interested reader, I need make no further apologies for the imperfect manner of my treatment of this subject." The treatment is, naturally, far from exhaustive, the details relating mainly to southern Michigan, but a wide circle of readers will be grateful for the large amount of new and first-hand information here brought together. The matter follows in logical sequence, and a few errors in personal names, and a little indistinctness here and there in setting off the parts of the narrative derived from different sources, can be easily pardoned. An index, however, would have been of great service.

The work is divided into nineteen chapters, with captions indicative of their contents. The first, entitled 'My Boyhood among the Pigeons,' is delightfully reminiscent of the author's own early experiences with pigeons in southern Michigan. The second and third chapters are reprints

[1] Since these lines were written the sad news has been received of Professor Newton's death. See below, under 'Notes and News.'

[2] The | Passenger Pigeon | By | W. B. Mershon | [Seal] New York | The Outing Publishing Company | 1907 — 8vo, pp. xii + 225, 3 colored and 6 half-tone plates. (Price, $3.00 net.)

of Alexander Wilson's and Audubon's accounts of the Passenger Pigeon, with a colored reproduction of Audubon's plate. These form so important a part of the early history of the subject that their entire republication is far more satisfactory than could have been any attempt at excerpting or paraphrasing. Then follows, as Chapter IV, 'As James Fennimore Cooper Saw It,' consisting of pertinent and graphic extracts from 'The Pioneers' and 'The Chainbearer,' relating to the pigeon as seen in early days in central New York. Chapter V is Chief Pokagon's account, published in 'The Chautauquan' in November, 1895 (Vol. XXII, No. 20), and relates to pigeons as seen by him in Ohio and Indiana as well as in Michigan. This is followed by a transcript of the late Major Bendire's account of this species given in his 'Life Histories of North American Birds' (1892). This includes the greater of Mr. Brewster's article on the pigeon published in 'The Auk' (VI, Oct. 1889, pp. 285–291), and the omitted parts are given in Mr. Mershon's Chapter VII, 'Netting Pigeons.' Thus is copied entire, in Chapters II–VII (pp. 9–76) the greater part of the standard literature relating to the natural history of the Passenger Pigeon. Chapters VIII–XI (pp. 77–140) chronicle its slaughter, beginning with Prof. H. B. Roney's paper in the 'American Field' (of Jan. 11, 1879), and the counter-statement by E. T. Martin in a circular issued later in the same year, followed by statements from correspondents who, as former shippers of pigeons, and thus conversant with the statistics and methods of pigeon slaughter, give valuable data here for the first time published.

Chapter XII, 'The last of the Pigeons,' consists of a series of notes from 'The Auk' (1895–1898), contributed by Ruthven Deane, and of various communications to the author not before published. Chapter XIII, 'What Became of the Wild Pigeon,' is an article contributed by Sullivan Cook to 'Forest and Stream' in 1903, who states, among other things, that for forty days, during one season, three car loads of pigeons a day were sent to eastern cities from a single shipping point in Michigan, or a daily shipment of nearly 25,000 dozen, or a total of 1,000,000 birds; and that in three years 990,000 dozen, or about 11,000,000, were caught and shipped east from the northern part of the southern peninsula of Michigan. He says: "And when you are asked what has become of the wild pigeons, figure up the shipping bills, and they will show what has become of this, the grandest game bird that ever cleft the air of any continent."

Various theories of the disappearance of the wild pigeons having been put forth, these are recited, Chapter XIV being a communication from C. H. Ames, who advocates the hypothesis that they must have been destroyed by natural agencies, perhaps by being drowned in the Gulf of Mexico while migrating across it, or by other similar catastrophies elsewhere. Comment on this theory was secured by the author from Mr. Ridgway, who says: "Nothing in the history of the Passenger Pigeon is more certainly known than the fact that its range to the southward *did not extend beyond the United States*. . . . The range of the Passenger

Pigeon was limited to the mixed hardwood forest region of the eastern United States and Canada, and any that occurred beyond were stragglers, pure and simple."

Subsequent chapters bring down the record to date of stragglers seen, or supposed to have been seen, in various parts of the country, east as well as west; and Mr. Deane's paper on the Passenger Pigeon in confinement is republished from 'The Auk' (XIII, 1896, pp. 234–237, together with letters from Professor C. O. Whitman on the same subject.

The work has as a frontispiece a colored plate of the Passenger Pigeon, drawn by L. A. Fuertes; a reproduction in color of Audubon's plate of this bird; two half-tone plates of the Passenger Pigeon and Mourning Dove, showing both species side by side photographed to the same scale; a colored plate of the Band-tailed Pigeon, by Allan Brooks, for comparison with the Passenger Pigeon; and other pertinent illustrations of interest.

Although Mr. Mershon nowhere gives a summary of the evidence respecting the practical disappearance of the Wild Pigeon, he expresses himself as "satisfied that the destruction of the pigeons was wrought to gratify the avarice and love of gain of a few men who slaughtered them until they were virtually exterminated" (p. 163, footnote).— J. A. A.

Fleming on the Disappearance of the Passenger Pigeon.[1]— The capture of single birds from 1887 to 1893 is mentioned, as also the shipment in 1892 and 1893 of several hundred dozen each year from the Indian Territory to New York and Boston, these being "the last records we have of the Passenger Pigeon as anything more than a casual migrant. The records ceased after this till 1898 when three were taken at points widely apart. . . . For all practical purposes the close of the nineteenth century saw the final extinction of the Passenger Pigeon in a wild state." He states that none of the "persistent rumours of the return of pigeons. . . . has borne investigation."— J. A. A.

Report on the Immigration of Birds in England and Wales in the Spring of 1906.— The second Report of the Committe appointed by the British Ornithologists' Club on the spring migration of birds into England and Wales[2] conforms in plan and general character with the Report for 1905, fully described in a previous number of this Journal.[3] Thirty-four species — five additional to those reported upon for the spring of 1905 — are specially treated, a résumé of the dates and manner of arrival for each

[1] The Disappearance of the Passenger Pigeon. By James H. Fleming. Ottawa Naturalist, Vol. XX, pp. 236, 237, March 22, 1907.

[2] Report on the Immigration of Summer Residents in the Spring of 1906. By the Committee appointed by the British Ornithologists' Club. 8vo, pp. 189, April, 1907. = Bulletin British Orn. Club, Vol. XX.

[3] Auk, XXIII, Oct. 1906, p. 472.

being separately given, followed by a chronological summary of the records, and a map on which are plotted the places and dates of arrival. An introduction of 28 pages states the method and purpose of the work, and gives a tabular presentation of the weather conditions and the arrival records. At the end of the Report is a summary of the records of some 40 'unscheduled birds,' or species with too few records to treat formally, and a list of the observers and lighthouses from whom observations were received, and a map showing the points at which the observations were made.

A few of the general statements made in the 'Introductory' are to the effect that the "west of England was in many cases populated before the east and southeast." 'A well-defined route, followed by various streams of immigrants, passes due north from Devon, through Wales and the western counties of Scotland. In the case of some species, which arrived along the whole of the south coast, the direction of flight was due north, but their western flank was invariably in advance of the eastern." Some other species held a northwesterly course, and a few others a northeasterly course. It is the purpose of the Committee to continue these observations and reports for several years, reserving generalizations till much more information has been gathered. The Committee for 1906 consisted of F. G. Penrose, chairman, C. B. Rickett, C. B. Ticehurst, N. F. Ticehurst, and J. L. Bonhote, secretary.— J. A. A.

Forbes's 'An Ornithological Cross-section of Illinois in Autumn.'— This novel contribution to ecology gives the results of observations made by Messrs. A. O. Gross and H. A. Ray, on a trip across the State of Illinois from Danville to Quincy, August 28 to October 17, 1906, under the direction of Professor Forbes, who here[1] summarizes the results. The strip surveyed was 150 feet in width for the whole distance of 192 miles, or an area of five and a half square miles. The total number of birds observed, and recorded with reference to their mode of occurrence, as whether in corn, wheat, stubble, or plowed fields, meadows, orchards, pasture lands, swamps, etc., was 4804, representing 93 species. Of this total number 1620, or about one third, were English Sparrows; 90 per cent. of the birds seen belonged to 20 species, and 85 per cent. to 15 species. Eliminating the English Sparrow from consideration, the number of individuals seen for 18 species ranged, respectively from 57 for the Blue Jay to 517 for the Crow Blackbird.

Besides the discussion of the observations, the data are conveniently presented in 12 tables, and the paper closes with a tabular list of all the species observed; the route is divided into six sections, thus giving approximately the dates and localities where the birds were seen, as well as the number for each section.

[1] An Ornithological Cross-section of Illinois in Autumn. By S. A. Forbes. Bull. Illinois State Laboratory of Nat. Hist., Vol. VII, April, 1907, pp. 305–335.

The list is interesting from several points of view; as the period of observation included the most important portion of the fall migration, it is not surprising to note that many of the summer residents and early migrants were met with only during the first part of the journey, and the later migrants only toward its close. Only 13 individuals are recorded for the whole family Tyrannidæ, of which six are Phœbes and three are Kingbirds — two of the latter for the last three days of August, and the other for October 12–17! A Rough-legged Hawk is entered as seen the last of August; only one Chipping Sparrow is recorded, for the period Sept. 17–21; also one each for the Red-eyed, Philadelphia and Solitary Vireos, one Yellowthroat and one Mockingbird. The Song, Swamp and Lincoln's Sparrows were not noted till October. There is brief reference to a later trip made by the same observers, from Cairo twelve and a half miles northward, with very different results as to the prevailing species represented, while the number of individual birds to the square mile showed an increase of from 874 to 5882.

Says the author: "Definite conclusions of permanent value concerning the numbers and significance of the bird life of the State evidently cannot be drawn until many such pictures as these have been assembled, compared, and adjusted in their right relations; and it has been the principal object of this paper to describe and illustrate one process, at least, by which the materials necessary to a correct general view of the ornithological ecology of the State may be brought together and made available."— J. A. A.

Bangs on the Wood Rails.— Only the species occurring north of Panama [1] are here treated, namely *Aramides axillaris*, *A. cajanea*, *A. albiventris*, *A. a. mexicanus*, and *A. a. plumbeicollis*. Following a 'key' to the five forms, each is described in detail, including tables of measurements, with a discussion of its relationships and geographical distribution. *A. a. mexicanus* is here first described, it differing from true *albiventris* in darker colors throughout.— J. A. A.

Berlepsch on New Neotropical Birds.[2]— Of the thirty 'new' forms here described (17 species and 13 subspecies), seven had previously been named and briefly described in Vol. XVI of the Bulletin B. O. C., in May, 1906. *Idioptilon* is a new genus of Tyrannidæ (type, *I. rothschildi* sp. nov.), and a third of the new species and subspecies belong also to this family. About half of these new forms are from Argentina and Bolivia, and the others mostly from Brazil, Ecuador, and Colombia.— J. A. A.

[1] On the Wood Rails, Genus *Aramides*, occurring North of Panama. By Outram Bangs. American Naturalist, Vol. XLI, March, 1907, pp. 177–187.

[2] Descriptions of New Species and Subspecies of Neotropical Birds. By Hans Graf von Berlepsch. Proc. IVth Internat. Orn. Congress, 1905 (1906), pp. 347–371.

Berlepsch on the Tyrannidæ.[1]— As is well known, Count von Berlepsch has long given special attention to this difficult family of birds, and here presents his latest conclusions respecting the relationships and status of the genera usually referred to it, and gives his opinion respecting the status and proper nomenclature of a considerable number of the species. He divides the family into seven subfamilies, of which three are new, as follows: (1) Tæniopterinæ, with 22 genera; (2) Tyranninæ, with 10 genera; Myiarchinæ, subf. nov., with 13 genera: (4) Rhynchocyclinæ, subf. nov., with 4 genera; (5) Platyrhynchinæ, with 22 genera; (6) Serpophaginæ, subf. nov., with 5 genera; (7) Elæniæinæ, with 12 genera. Several new species and subspecies are proposed, and the following new genera: (1) *Xanthomyias*, type *Muscicapa virescens* Temm.; (2) *Oreomyias*, type *Pogonotriccus plumbeiceps* Lawr. The heretofore current generic position of a large number of species is here changed.— J. A. A.

Berlepsch on the Genus Elænia.[2]— Forty-nine forms of this genus (*Myopagis* is merged with true *Elænia*) are here recognized — 31 species and 18 additional subspecies, or 12 more than were listed by Sharpe in 1901. Two species and six subspecies are described as new. The preliminary matter includes comment on the affinities of the genus, its geographical distribution, habits of the species, nesting and eggs, and an extended résumé of the literature, but not a word on the seasonal variation in color, so striking in many of the forms, shown not only in freshly moulted birds as compared with birds in the faded breeding plumage, not only in specimens from the same locality but in individual moulting birds in which both plumages may frequently be seen. Neither is anything said of the wide range of individual variation in the size and shape of the bill, and in general size, nor of the varying amount of concealed white in the crest, which is often absent in some forms in the younger birds. Yet many forms here recognized seem to rest on just such differences. Sixteen years ago, when the present reviewer had something to say on some of the species and subspecies of this group, the fashion of fine splitting had not nearly reached its present stage of refinement, and many forms then synonymized we should now freely recognize, but not, we fear to the same extent as in the able and very valuable monograph here under notice. The amount of seasonal and individual differentiation unquestionably evident in every large series from any single locality should inspire caution when it comes to the naming of new forms from single specimens.

This valuable monograph gives careful descriptions of all the forms recognized, full bibliographies of each, and a list of the localities from

[1] Studien über Tyranniden. Von Hans Graf Berlepsch. Proc. IVth Internat. Orn. Congress, 1905, (1906), pp. 463–493.

[2] On the Genus *Elænia* Sundev. By Hans Graf von Berlepsch. Proc. IVth Internat. Orn. Congress, 1905 (1906), pp. 372–448.

which specimens have been reported; also a key for the determination of the species; a table showing their geographical distribution, and a list of localities; also a list of the species wrongly placed in *Elænia* by different authors, with their proper designations; and finally a list of the specimens of *Elænia* (about 380) contained in the author's collection, and representing 39 of the 49 forms recognized.— J. A. A.

Berlepsch and Stolzmann on Birds from Peru.[1]— During the years 1893-1898 M. Jean Kalnowski made considerable collections of birds in various parts of Peru, which form the basis of the present report. The species are listed in seven categories, in accordance with the localities at which they were collected, and include about 200 species. One genus and 14 subspecies are described as new, and several others are for the first time recorded from Peru. The technical annotations relate mainly to the character of the specimens in comparison with those from other localities but in part to questions of nomenclature. In adopting the name *hedwigæ* in place of *fulgentissima* for a species of *Chlorochrysa* (p. 108), these authors appear to have overlooked the fact that *fulgentissima* is the earlier name, the paper in which it occurs having been published Sept. 12, 1901, while *hedwigæ* was first published in the October number of 'The Ibis' of the same year, or nearly three weeks later than *fulgentissima*. Thirteen species of North American birds are recorded as winter visitors, of which eight are Plovers and Sandpipers and five are Passeres, the latter being *Hylocichla swainsoni*, *Piranga rubra*, *Dendroica "rara"* (= *cerulea*), *Wilsonia canadensis*, and *Empidonax pusillus traillii*.— J. A. A.

Jourdain's 'The Eggs of European Birds.'—Part II of this excellent work[2] treats the species in sequence, with their various subspecies, from No. 30, *Loxia leucoptera bifasciata*, to No. 78, *Motacilla flava*. Under each species are given the common vernacular names by which they are known in the various countries of Europe, references to the leading standard works on European birds, and to the works where the eggs of the species have been previously figured. The breeding range is next stated in general terms, and amplified in paragraphs relating to its general distribution (*a*) in the British Isles, (*b*) in continental Europe. The character and position of the nests are described in considerable detail, as are also the eggs and their principal variations. The measurements and weights given are often the averages of large series. About two pages are thus devoted to each species,

[1] Rapport sur les nouvelles Collections ornithologiques faites au Pérou par M. Jean Kalinowski. Par Hans Graf von Berlepsch et Jean Stolzmann. Ornis, Vol. XIII, Sept., 1906, pp. 63–133.

[2] The Eggs of European Birds. By the Rev. Francis C. R. Jourdain, M. A., M. B. O.U. Part II, London: R. H. Porter, 7 Princes St., Cavendish Square, W., 1906. 8vo, pp. 81–160, 14 col. pll. Price, 10s. 6d. per part, net.

and less to the subspecies, filled with pertinent and well-digested information. The nomenclature and general view-point is well up to date. Marginal headings clearly set off the topical divisions of the subject matter, adding clearness of arrangement without sacrifice of space. The work gives the impression of thoroughness and reliability,— in others words, appears to be an excellent hand-book of European Oölogy, the plates being good, and the typography all that need be desired. The work will comprise ten parts, with 140 colored plates.— J. A. A.

Hartert's 'Die Vögel der Paläarctischen Fauna,' Heft IV.[1]— Part IV of this exceedingly useful work completes the Paridæ, includes the families Laniidæ, Ampelidæ, Brachypodidæ, and Campephagidæ, and begins the family "Muscicapidæ," which here includes the current families Sylviidæ, 'Timeliidæ,' and Turdidæ, the author stating that it is impossible to separate the families Muscicapidæ, Sylviidæ and Turdidæ. The Muscicapidæ (sens. strict.) are all included in the present part, and the account of *Phylloscopus* (Sylviidæ auct.) is begun. About half-a-dozen subspecies are characterized as new.

The method of treatment is, of course, the same as in the former parts, and has already been stated in notices of them in this journal.[2] The present part includes species and subspecies Nos. 630–795. The general criticisms made in our notices of previous parts are still applicable here, and need not be repeated. Attention, however, may be called to a few points which go to confirm them, as where (p. 394) it is said that "*Regulus satrapa* muss als Unterart von *Regulus regulus* betractet werden"; and where (p. 423) *Lanius borealis* is not only made a subspecies of *L. excubitor* but all the various forms of *L. ludovicianus*, it is also declared, must be regarded as subspecies of *L. excubitor*. In the key on p. 456, *Ampelis cedrorum* is given as a subspecies of *A. garrulus*! Such combinations give the author's point of view in regard to the matter of subspecies, and may well be borne in mind when other parts of the work are under consideration.

He adopts *Bombycilla* Vieillot, 1807, for the Waxwings in place of *Ampelis* Linné, 1766, remarking that through no process of elimination can *Ampelis* be retained for the Waxwings. The reasons for a ruling so contrary to current usage would be welcome, none being here stated.— J. A. A.

Beebe on the 'Owls of the Nearctic Region.' — The Eleventh Annual Report of the New York Zoölogical Society contains two ornithological papers, both by the Curator of Birds, Mr. C. William Beebe. The first

[1] Die Vögel | der paläarctischen Fauna. | Systematische Übersicht | der | in Europa, Nord-Asien und der Mittelmeerregion | vorkommenden Vögel. | Von | Dr. Ernst Hartet. | — | Heft IV. | — | Seite 385–512. | Mit 32 Abbildungen. | — | Berlin. | Verlag von R. Friedländer und Sohn. | Ausgegeben im März 1907.— 8vo, pp. 385–512. Preise 4 mark.

[2] Auk, XXI, pp. 95, 505, XXII, p. 428.

relates to the 'Owls of the Nearctic Region' (pp. 157–192, with numerous half-tone illustrations), and the second is a 'List of the Birds living in the New York Zoölogical Park, December 31, 1906' (pp. 193–212).[1] (See below, under 'Notes and News.') Mr. Beebe treats first of owls in general, their structure, relationships and adaptations; then especially of the owls of North America, by groups or genera, enumerating the species, their ranges, and their leading characteristics and ways of life. We here meet for the first time, we believe, the adoption of the generic name *Otus* for the Screech Owls, in place of *Megascops*, in accordance with a recent and as yet unpublished ruling of the A. O. U. Committee on Nomenclature.[1] J. A. A.

Woodruff's 'The Birds of the Chicago Area.'[2]—The territory here considered includes all of Cook and Du Page Counties and the northern part of Will County, Illinois, and the northern part of Lake County, Indiana, or "an area about 50 miles square." An introduction of 24 pages describes the topographic and climatic conditions of the region, certain localities of special interest, with comment on certain extralimital species, and on migration. Then follows the list, very fully annotated, including the citation of authorities for the rarer records; the manner of occurrence is stated, often with reference to former conditions when the species was more abundant. In this connection Mr. E. W. Nelson's 'Birds of Northeastern Illinois,' published in 1876, is drawn upon at length, with great advantage. A short paragraph is usually devoted to the general range of the species outside of Illinois, based mainly on the ranges given in the A. O. U. Check-List or Mr. Ridgway's 'Birds of North and Middle America.' The classification and nomenclature of the A. O. U. Check-List being avowedly followed, considerable space under each species is rather wastefully devoted to synonymy.

The list has evidently been prepared with great care and can hence be safely taken as authoritative. It contains a large amount of conveniently arranged information about the birds of the 'Chicago Area,' both past and present. The number of species listed is apparently not stated. An extended — probably nearly complete — bibliography, and separate indexes to the scientific and common names, fittingly close this very creditable piece of work. Nine of the twelve half-tone plates illustrate special features of the country; the other three give views from life of a Bonaparte's Gull, a young Black Tern, and the Belted Plover, with its nest and eggs.— J. A. A.

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[1] See, however, Stone, Auk, XX, 1903, pp. 272–276.

[2] The Birds of the Chicago Area. By Frank Morley Woodruff. Chicago Academy of Natural Sciences. Bulletin No. VI of the Natural History Survey. Issued April 15, 1907.— 8vo, pp. 1–221, with 12 half-tone plates. Price, 75 cents.

Fleming on Migrations of Brünnich's Murre.[1]— Brünnich's Murre is an Arctic species, breeding in North America from the Magdalen Islands, in the Gulf of St. Lawrence, northward, and appears to be ordinarily only to a small extent migratory. At intervals, however, it appears in some numbers as far south as Long Island, New York, and occurs as a straggler south to Chesapeake Bay and westward along the Great Lakes. Its appearance at any of these points is usually rare and irregular, but during the last fifteen years there have been several notable invasions of this species. Mr. Fleming has done excellent service in compiling and mapping these migrations. His record begins with the winter of 1890–91, when the species appeared in unusual numbers on the New England coast. None were noted for the winter of 1891–92, and only a few for that of 1892–93. In the winter of 1893–94 there was a large migration to the Great Lakes, notable as being their first appearance in this region, while few were seen on the Atlantic coast. The next great migration, and "the most extensive recorded," occurred in the winter of 1896–97, "reaching far down the Atlantic coast and into the interior of eastern North America"— on the coast to North and South Carolina, in the interior to central Indiana. The following winter there was a restricted migration to the St. Lawrence and its tributaries. In 1899–1900 there was again a widespread migration, extending southward along the coast to Virginia, and in the interior to Lake Ontario. For the following winter the records were few; more were seen in 1901–02, but during the following three winters there was no notable invasion.

Mr. Fleming gives reasons for believing that these migrations originate in Hudson Bay, and are caused by lack of food, due to the closing in of the moving and shore ice, thus depriving them of access to open water. They usually arrive in an emaciated condition, and, visiting regions "unsuited to sustain the life of a bird whose food is marine," it seems probable that none of the thousands of birds that make the unusual journey ever return to their place of origin. Two maps illustrate Mr. Fleming's excellent paper, one showing the places of record for the species from 1890 to 1903, and the other for the great migration of 1896.— J. A. A.

Lass's Bird Life of a City Garden.[2]— This is a list of birds observed in a city garden in Charleston, S. C., based on records made in 1902–06, inclusive, and numbers 90 species. Some are common summer residents and breeders in the garden; others are transient visitors or are noted as merely passing over, as in the case of some of the larger hawks, herons, etc. The list is naturally of much local interest, and was published largely for the

[1] The Unusual Migration of Brünnich's Murre (*Uria lomvia*) in Eastern North America. By J. H. Fleming. Proc. IVth Internat. Orn. Congress, 1905 (1906), pp. 528–543, with two maps.

[2] Bird Life of a City Garden. By Herbert Ravenal Lass. Bull. of College of Charleston Museum, Vol. II, No. 7, November, 1906, pp. 57–66.

purpose of awakening interest in nature study among the teachers of the city.

The same number of the 'Bulletin' records the capture of a Frigate Bird (*Fregata aquila*) on Sullivan Island, Charleston harbor, on October 20, 1906, which makes the second record of this species for South Carolina.— J. A. A.

Shufeldt on the Osteology of the Tubinares.[1]— Following a review of the literature of the general subject, are a few pages on the osteology of *Puffinus borealis*, with a half-tone figure of the skeleton, and a short discussion of the taxonomy and affinities of the Tubinares. The classification that seems to the author to be "natural" is the same as that given in Sharpe's 'Hand-List of Birds.'— J. A. A.

NOTES AND NEWS.

Alfred Newton, an Honorary Fellow of the American Ornithologists' Union, died at Cambridge, England, June 8, 1907, at the age of 78 years. Prof. Newton was born in Switzerland, June 11, 1829, of English parents, he being the fifth son of William Newton, formerly member of Parliament for Ipswich, and of Elizabeth (Milnes), daughter of Richard Slater Milnes, formerly member of Parliament for York. He was graduated B. A., in 1853, at Magdalen College, Cambridge, and later, as a traveling Fellow of the College (1854–1863), visited Lapland, Iceland, the West Indies, and North America, and in 1864 he visited Spitzbergen. He was elected professor of Zoölogy and Comparative Anatomy at Magdalen College in 1864, which position he held at the time of his death.

Professor Newton was one of the twenty original members of the British Ornithologists' Union, founded in November, 1858 at Magdalen College, Cambridge, which organization resulted in the establishment of a Quarterly Magazine of Ornithology, 'The Ibis,' the first volume of which was published in 1859, under the editorship of Dr. P. L. Sclater. The second series of 'The Ibis' (1865–1870) was edited by Newton; he also prepared the bibliographical matter for the 'Aves' of the 'Zoölogical Record' for the years 1864–1869, and was editor of the 'Zoölogical Record,' 1870–1872. His principal publications are 'The Zoölogy of Ancient Europe' (1862), the 'Ornithology of Iceland' (1863), 'Oötheca Wolleyana' (1864–1907), 'Zoölogy' (1874, 1894), 'Yarrell's British Birds' (4th ed.,

[1] On the Osteology of the Tubinares. By R. W. Shufeldt. Amer. Nat., Vol. XLI, Feb. 1907, pp. 109–124.

Vols. I, II, 1871–1882), and 'A Dictionary of Birds' (1893–1896). The latter is made up largely of earlier contributions to the 'Encyclopædia Britannica,' here revised, often amplified, and brought down to date, with the assistance of several collaborators, as Dr. Gadow for the anatomical subjects and Dr. Lydekker for palæornithology. His minor contributions to the proceedings of various scientific societies and natural history journals are numerous and cover a wide range of ornithological subjects. His 'Dictionary of Birds,' however, is his enduring monument, and is the one ornithological work of greatest service to the greatest number. Newton's preëminent erudition in the field of ornithology, his excellent judgment in all matters bearing upon its history and development, and his unsurpassed clearness of exposition, are especially exemplified in the 'Dictionary,' the introduction to which is a critical review of the literature of ornithology of value for all time.

Professor Newton received medals from the Linnæan and Royal Societies of London, and served repeatedly as Vice-President of the Royal Society and of the Zoölogical Society, and was President of the Cambridge Philosophical Society. He took a deep interest in bird protection, first bringing the subject to the attention of the British Association for the Advancement of Science in 1868, and later securing the enactment of various Acts of Parliament for their protection. He was also chairman for many years of the British Association Committee on the Migration of Birds.

Doubtless few American ornithologists who have been in England have failed to visit Cambridge to make the acquaintance of this great master, who has won their respect, not to say affection, to a greater extent than any other foreign ornithologist. He was also a most genial and faithful correspondent. In a letter of his to the writer, dated 18 May, 1907, and thus written but three weeks before his death, he refers to himself as having been "more or less of an invalid" for the previous two months, but there is nothing to imply serious illness, or to arouse apprehension for the future. The news of his death by a cable dispatch from London thus came as a sad surprise.

Thomas Henry Douglass, one of Illinois' best informed ornithologists, died at Los Angeles, Cal., April 2, 1907. Mr. and Mrs. Douglass left their home in Waukegan, Ill., in December to visit California, as they had done in several previous years. Mr. Douglass had a severe cold, and later heart trouble developed, which soon terminated fatally. He was 55 years old, and during the sixties and seventies did a good deal of active field work among the birds of Lake County, Illinois, securing many rare specimens of birds and eggs, which were then new to the State. Mr. Douglass conducted one of the largest nurseries in this country, his specialty being Conifers of every variety, which he raised from seeds and supplied the young trees to most of the other nurseries in the United States. He was a

thorough lover of nature, very modest and kind-hearted, and beloved by all who knew him.[1] —H. K. C.

THE A. O. U. Committee on the Nomenclature and Classification of North American Birds held a five days' session in Washington in April (April 18–25), at which satisfactory progress was made in settling the large number of cases that awaited its action preparatory to the publication of a new edition of the Check-List. A few questions, relating mainly to little known forms of birds, were necessarily deferred on account of lack of material, but all questions of nomenclature were practically cleared away, and only the preparation of the manuscript for the printer remains to be completed. This, however, is a serious undertaking, especially the part relating to the geographical ranges of the species and subspecies. The preliminary draft for this part, kindly undertaken for the Committee by Mr. Stone, is, however, well advanced, but the new Check-List as a whole will probably not be ready for the printer before the end of the present year.

It is an open secret that the new Check-List will differ materially in arrangement from former editions, through the adoption of a modern system of classification, and also otherwise through the elimination of the old concordance and the secondary references. The various propositions in reference to the character of the vernacular names, which have been suggested to the Committee, either publically in 'The Condor' or 'The Auk,' and also privately through correspondence, have been carefully and for the most part favorably considered, so that the changes that will be made in this respect will meet all of the essential objections that have been raised in reference to this important feature of the Check-List.

THE rapid development of the New York Zoölogical Park is emphasized by the Eleventh Annual Report of the Society (for the year 1906) recently issued. The satisfactory increase of all the departments, and the completion of many permanent improvements is noted, as also the good health and very low rate of mortality prevailing among the animals. The bird collection, at the close of the year 1906, "contained living examples of 26 orders of birds out of the total 31 orders," while the net increase over 1905 was 136 species and 549 specimens. The total number of specimens at the end of 1906 was 2104, representing 491 species, the birds of the United States being represented by about 170 species. Great advance has been made in labeling the collection with large descriptive labels, embracing maps showing the distribution of the species. The management, Director Hornaday, and his able corps of Curators, are entitled to the highest credit for developing a zoölogical park of the first rank in so short a period.

[1 See also an appreciative reference to Mr. Douglass in 'The Auk' for April, 1907, p. 122, in a paper by Mr. John F. Ferry on 'Ornithological Conditions in Northeastern Illinois,'— ED.]

During the last year a considerable number of important bird groups have been added to the collections of the American Museum of Natural History, a more detailed account of which, with illustrations, may be given later. These include, among others, the Heath Hen, the Prairie Hen, the Sage Grouse, the Golden Eagle, the Sand Hill Crane, the Anhinga, the Farallone Cormorant, an Arizona Desert Group, and a new Brown Pelican Group. Material was gathered in April and May of the present year by Mr. Chapman in the Bahamas for a Man-o'-War Bird group and a Booby group, and in Georgia for an Egret group. He is now in the Saskatchewan region to secure material for a large group of marsh-breeding waterfowl, and later will visit the Canadian Rockies for material for groups of Alpine species.

Mr. E. Thompson Seton, accompanied by Mr. Edward A. Preble of the U. S. Biological Survey, is spending the present season in the exploration of the region northeast of Lake Athabasca, with especial reference to the mammals and birds, and will doubtless add greatly to our knowledge of that little known area.

The occurrence of an immense flock of Thick-billed Parrots (*Rhynchopsitta pachyrhyncha*), numbering from 700 to 1,000, in the Chiricahua Mountains, Arizona, in August, 1904, is recorded in 'The Condor' for July, 1907 (IX, p. 104) by Mr. Austin P. Smith, who believes that this species is not so casual in Arizona as has been supposed, but may be expected to occur "every few years or so" in the mountains of southern Arizona.

A noteworthy arrival at the Zoölogical Gardens in London is a collection of living South American Hummingbirds received May 27 last, through the liberality of Captain Albert Pam. Of a consignment of some fifty specimens, all from Venezuela, twenty arrived alive, representing four species.

A LAPLAND LONGSPUR TRAGEDY.
Dead Lapland Longspurs lying where they fell on the ice of a lake near Worthington, Minn., during a storm, March 13-14, 1904.